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CONTENTS

ILLUSTRATIONS:	PAGE.	EDITORIALS:	PAGE.
Electric Locks for Derails at Crossings.....	629	Annual Reports—Chicago, Milwaukee & St. Paul—Illinois Central.....	635
The Atchison Weed Burner.....	630	EDITORIAL NOTES.....	634, 636
Anchorages for the New East River Bridge.....	630	GENERAL NEWS:	
A New Surface Cattle Guard.....	633	Locomotive Building.....	639
A Heavy Bar Shear of Recent Design.....	633	Car Building.....	639
Bell's Spark Arrestor on the Baltimore & Ohio.....	636	Bridge Building.....	639
Standard Roadside and Station Signs on the C. & N. O. & T. P.....	637	Meetings and Announcements.....	640
		Personals.....	640
		Elections and Appointments.....	640
		Railroad Construction.....	641
		Electric Railroad Construction.....	641
		General Railroad News.....	642
		Electric Railroad News.....	642
		Traffic.....	642
		MISCELLANEOUS:	
		Technical.....	638
		The Scrap Heap.....	639
		Tests of Tie Plates.....	629
		Foreign Railroad Notes.....	633

Contributions.

Protection of Main Line Switches.

NEW YORK, AUG. 31.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In a recent collision on an important road the accident was caused by an extra train pulling out on the time of a regular train without orders. Here is a point where facing point protection would have prevented the accident. The cost of installing proper signals, operated by the person who throws the switch, is very small and for a single signal will not exceed \$100 completely installed, which includes a two-lever switch stand, which, of course takes the place of any switch stand which was already in use.

The first points to be protected in any railroad are the outlying facing point switches. A much larger measure of safety would be secured by the same amount of cost than by any other form of investment in signaling or interlocking.

The ordinary grade crossing where a single line crosses a single line will cost probably \$3,000 to protect by a system of interlocking, and the continuous operating cost of the same will probably amount to six per cent. on \$20,000, and, with this expenditure, will only protect a single point of danger, that is the crossing. If this same money were invested in facing point switch protection it would protect, say, 30 points, and there would be no continuous charge for operation, and there would be no apparent investment of \$20,000 to pay the annual cost of operation.

I do not disregard the necessity of interlocking all grade crossings, but merely desire to point out where the greatest amount of protection may be secured by the least expenditure. I believe that your records of accidents will show that more accidents have occurred from misplaced switches, so called, than from collisions at crossings, and it seems strange to me that railroads will not equip these facing point switches with semaphore signals when they provide so much safety at so small a cost.

SIGNAL ENGINEER.

Tests of Tie Plates.

We have from the Q & C Company (Benjamin Reece, Esq., Engineer) the following letter: "In your issue of May 28, 1897, there appeared a table of tests purporting to show the adhesion to the tie and the lateral resistance of several types of tie plates. Since our long observation, as well as common sense, teaches us that tie plates are loosened in the ties by the rapid undulations and vibrations of the rails under their rolling loads, it is difficult to see the value of a direct lifting test. In the spreading tests the rail was neither held down by spikes nor wheel load; so practical, as well as theoretical, trackmen will appreciate how far such tests are removed from the conditions which actually obtain in service.

"As the practical value of these tests has, so far as we know, remained unchallenged, in order to escape the suspicion of any personal bias, we determined to secure an expert opinion on same, which we herewith inclose. Further than this the correspondence explains itself."

The first document is a letter from the Q & C Co. to the R. W. Hunt & Co., extracts from which follow: "Enclosed herewith please find circular containing a series of tests concerning the holding power, etc., of several forms of tie plates. These tests were made at the Pittsburgh Testing Laboratory and are dated April 8, 1897. . . . We desire a critical examination of the tests as made, in order to determine what relation they bear to actual track conditions. . . ."

The reply of the Hunt Company follows nearly in full:

"It goes without saying that we are confident the ex-

periments were carefully conducted, the results accurately noted and reported, and we do not understand that you doubt those points, but desire us to express our opinion of the practical value of such tests, or rather how nearly they represent the conditions to which tie plates are subjected during actual service. . . . We have made many examinations of plates in service, and have also conducted a large number of laboratory experiments or tests of various plates. And we are forced to the conclusion that neither the one which we are now considering, or any so far made by ourselves, have met the case.

"In this experiment the plates were forced into the wood by a constant load, and then pulled out by power applied at a single and small point of their surface. There is nothing in actual service to represent either procedure—certainly not the last. If the rolling stock were suspended from the rails it might apply, but the lifting force is the wave motion of rolling force, the effect of which is very opposite to a steady pull applied at a central point. Moreover, we can appreciate that with the holding-down power at the four corners, as in the Goldie tie plate, a pulling force applied in the center might produce a drawing in of the claws, in fact an 'ice tong' result, which would require more power to withdraw the claws than would occur with a plate like the 'New C A C' reported upon, in which the claws, or more properly 'prongs,' are much nearer the center of the plate, and hence more directly under the pulling point.

"Our observation is that the less the fiber of a tie is cut, the longer it will last, and that it is important that what cutting has to be done shall break or disrupt the fiber as little as possible. . . .

"The service duty of ordinary railroad spikes and the adhesion points of a tie plate are not identical, the tie plate being intended to resist the direct downward pressure of the undulating rail, while the spike is designed to secure the rail against the reacting uplift. Hence laboratory tests, which might somewhat approximate actual conditions in the use of spikes, would be of much less value applied to tie plates. We think the above applies to the case under consideration. It would require quite elaborate and expensive apparatus, and operations extending over an extended period of time, to produce laboratory data of value relating to tie plates.

"Fortunately their actual use, extending over a number of years, has furnished and is daily giving the best basis on which to base conclusions as to what is best for all circumstances. In short, we would rather have one year's service in track, covering the climatic conditions incident to the location than much longer laboratory observations, no matter how elaborate. Extended and careful observations have given data; calculations based on them can be most carefully worked out, and thus tests made at several points on different railroads, under various sections of rails, and on all the usual woods used for tie purposes. The rolling stock will furnish the apparatus, the daily traffic, the application, and intelligent, careful and conscientious roadmen the observers."

Electric Locks for Derails at Crossings.

The National Switch and Signal Company, Easton, Pa., has lately equipped a number of grade crossings with interlocking signals in connection with which electric track-circuit locking has been employed to insure that after an engineman accepts and acts on a signal, he shall not be suddenly deprived of the right to the road which it gives. The diagrams given herewith show the arrangement of instruments and circuits for working these locks, and Mr. Hansel, general manager of the company, furnishes the following description:

Experience has shown the necessity of protecting against the changing of derails or switches immediately in front of a train which is moving at high speed. The arrangements of all properly designed signal plants provide that the signal cannot be clear unless the switch is locked in the proper position; but unless some provision is made to require the signal operator to keep the switch closed after a train has accepted a signal, and until it has passed beyond his jurisdiction, there is always a possibility of throwing the signal back to danger and opening the derail. This danger has been emphasized many times by derailments at high speed, which could not have occurred had the switches been equipped with suitable electric locking.

When interlocking was first introduced into the United States there was some effort made in this direction, but it failed to receive universal commendation for two reasons: First, that the apparatus and installation of the work was very complex, requiring the attention of a skilled electrician to insure its working, and, secondly, the cost was more than the railroads cared to incur; and the subject of electric locking was for a time dropped. The frequency of accidents, however, has forced the subject upon the consideration of signal engineers, and we have designed a device which is very simple and does not require the attention of an electrician, as it can be easily cared for by the leverman.

The track circuit between the home and distant signal, formerly used, has been abolished and the only wiring now used is within the limits of the derails. The drawing shows the application of electric locking to a simple grade crossing.

The electric lock is applied on the locking frame of the machine in such manner that when the magnets of the lock are de-energized, a bolt is plunged through the tappet by gravity and in this position the tappet, which in all interlocking machines is actuated by the latch handle on the lever (preliminary locking), cannot be moved and it is only after the magnets are re-energized that the tappet is released by the withdrawal of the bolt.

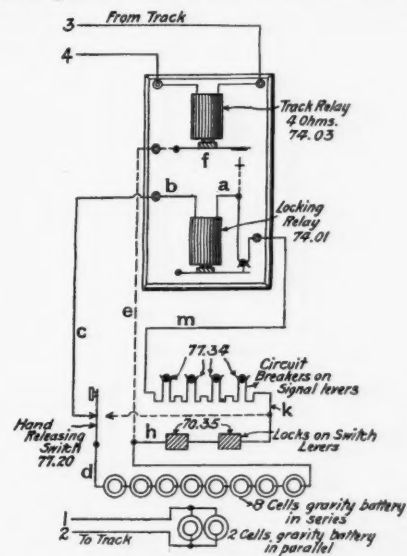
The electric lock has a cone-shaped armature which reduces the necessary battery to a minimum and assures accurate working of the lock. There can be no sticking of the armature on the poles of the magnet since they do not come in contact. The four home signal levers have circuit breakers on their vertical rods. The circuit from the tracks runs through the track relay 74.03. Having installed the circuits, insulated sections, electric locks, track and locking relays, batteries and circuit breakers, as shown, the operation will be as follows:

In order to pass a train over the crossing the operator must first close the derails on one track by throwing either lever 6 or 7, and the throwing of either lever locks the other in the opposite position. The interlocking provides that the derails on both tracks cannot be closed at the same time. Having thrown (reversed) lever 6 and closed the derails, the operator desires to pass a train from left to right and reverses home signal lever No 2. The act of reversing this lever de-energizes the lock magnet by means of circuit breaker 77.34 and causes its plunger to drop into the tappet, holding it as before described.

But putting this home signal lever "home" again would not release the electric lock, as the circuit once broken the armature (74.01) has fallen and broken the circuit, so that until this relay has been re-energized the armature cannot be lifted nor the circuit restored.

As soon as the first pair of wheels reaches the track circuit inside the derails the armature of the track circuit, 74.03, falls, completing the locking circuit through a, b, c, d, e and f, and energizing the locking relay; but the locks are not moved, as most of the current passes around them, owing to their greater resistance. When the train has passed out of the track circuit and therefore out of the derail limits, the track relay is re-energized, lifting its armature and forcing the entire current to pass through the locks by way of a, b, c, d, h, k, m, re-energizing them and withdrawing the plunger from the tappet, provided the home signal has been restored to its normal position. If it is not restored the circuit cannot be completed. It is necessary for the operator to return the home signal to danger before the train has passed out of the limits of the derail or else the operation of the locking relay will be ineffective and the operator will find that he cannot place the derail lever (6) normal so as to pass a train on the other track.

This might also occur in case a train which was ap-



Electro-Magnets for Track-Circuit Switch-Locking.

proaching the home signal (2) under a clear signal should be stopped before reaching the derail and remain there, while a train on the other track desired to cross. In order to avoid the tying up of the signals in such a case a release switch, 77.20, is provided. This switch is enclosed in a box having a glass face which the operator has to destroy before he can operate the releasing switch, and since he is required to report all such breakages it forms a check against the unnecessary use of the releasing switch. Experience has demonstrated that while this releasing switch should be provided for extreme cases, it is very seldom used.

The application of electric locking is, of course, not confined to simple grade crossings, but is found very desirable in the most complex interlocking plants and especially where a drawbridge is to be protected. The most important plants which have been protected by this company are:

The drawbridge at Peoria, Ill., for the Peoria & Pekin

Union; Seventeenth Street, Philadelphia, for the Philadelphia & Reading; five points on the C., M. & St. P.; Hilbert Junction, for the Wisconsin Central; Merrimac, C. & N. W.; Hartford, N. Y., N. H. & H.

It will be noticed that no crossing (detector) bars are shown in the plan; special note should be made of the security of substituting the rail circuit, which furnishes the assurance of safety as if the crossing bars were extended from derail to derail; the track between derails must be entirely clear before the opposing route can be set up. It will be seen that by using the rail circuit we have furnished a protection not possible with crossing bars or any mechanical means; and in considering the cost of applying electric locking we must deduct therefrom the cost of the four crossing bars necessary at a single track crossing.

We have shown detector bars at the derails, but they too may be dispensed with, as the rail circuit, through the action of the home signal lever and the electric lock, prevents the operator from changing a derail when a train is passing.

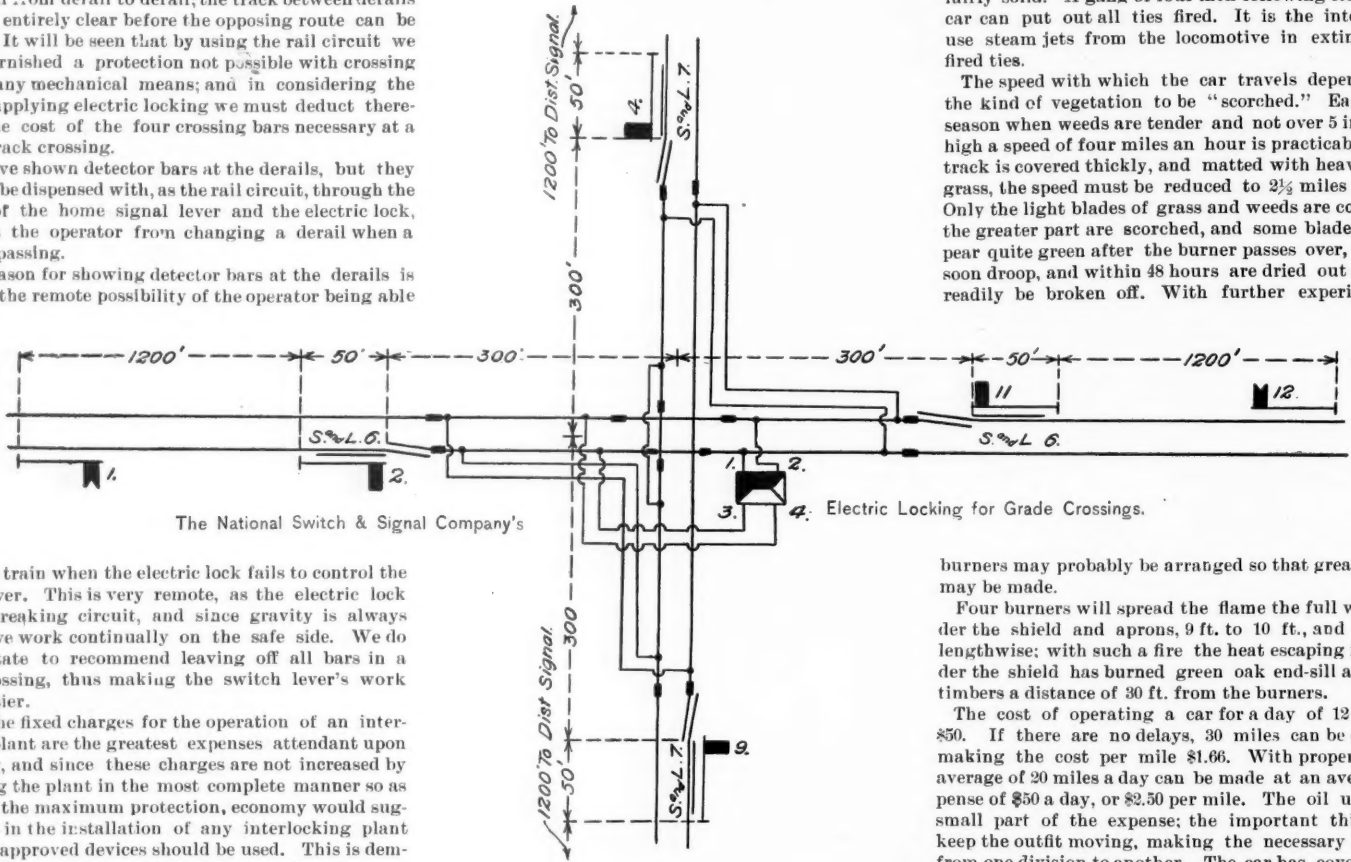
The reason for showing detector bars at the derails is to cover the remote possibility of the operator being able

of the car. The cab at the rear end is sheathed with corrugated iron secured direct to the frame, no wooden sheathing being used. There is a hand brake on the forward truck of the car.

The shield beneath the car is 32 ft. long with aprons at each side to retain the heat, and to prevent side winds from carrying the flame to one side of the shield. The

heated shield aiding combustion. Until the shield gets well heated a small amount of oil can be detected on the rail and ties, this being more noticeable when heavy oil is used. No inconvenience has been experienced from greasy rails, as this only occurs when the burners are first ignited. Only a few minutes are required to get an effective heat after reaching the place where the work is to be done. Ties do not catch fire if fairly solid. A gang of four men following close to the car can put out all ties fired. It is the intention to use steam jets from the locomotive in extinguishing fired ties.

The speed with which the car travels depends upon the kind of vegetation to be "scorched." Early in the season when weeds are tender and not over 5 in. or 6 in. high a speed of four miles an hour is practicable; if the track is covered thickly, and matted with heavy, coarse grass, the speed must be reduced to 2½ miles an hour. Only the light blades of grass and weeds are consumed; the greater part are scorched, and some blades will appear quite green after the burner passes over, but they soon droop, and within 48 hours are dried out and may readily be broken off. With further experience th



The National Switch & Signal Company's

to split a train when the electric lock fails to control the derail lever. This is very remote, as the electric lock acts by breaking circuit, and since gravity is always present we work continually on the safe side. We do not hesitate to recommend leaving off all bars in a plain crossing, thus making the switch lever's work much easier.

Since the fixed charges for the operation of an interlocking plant are the greatest expenses attendant upon signaling, and since these charges are not increased by equipping the plant in the most complete manner so as to secure the maximum protection, economy would suggest that in the installation of any interlocking plant the most approved devices should be used. This is demonstrated by experience and conceded by railroad managers. We believe that electric locking, while a small part of the total expense of installation, is a most necessary part. The costly accidents that have occurred which would have been prevented by the application of electric locking fully demonstrate its economy.

The Atchison Weed Burner.

The engravings show plan and vertical section of the railroad weed burner now in use on the Atchison, Topeka & Santa Fe. The device is intended for destroying vegetation between the rails and for a space of 24 to 30 in. outside of them. This is accomplished by burning crude oil, which is ignited under the forward part of the shield which is fastened to the under side of the car.

forward truck is protected by an auxiliary shield fastened to the bottoms of the lower arch bars.

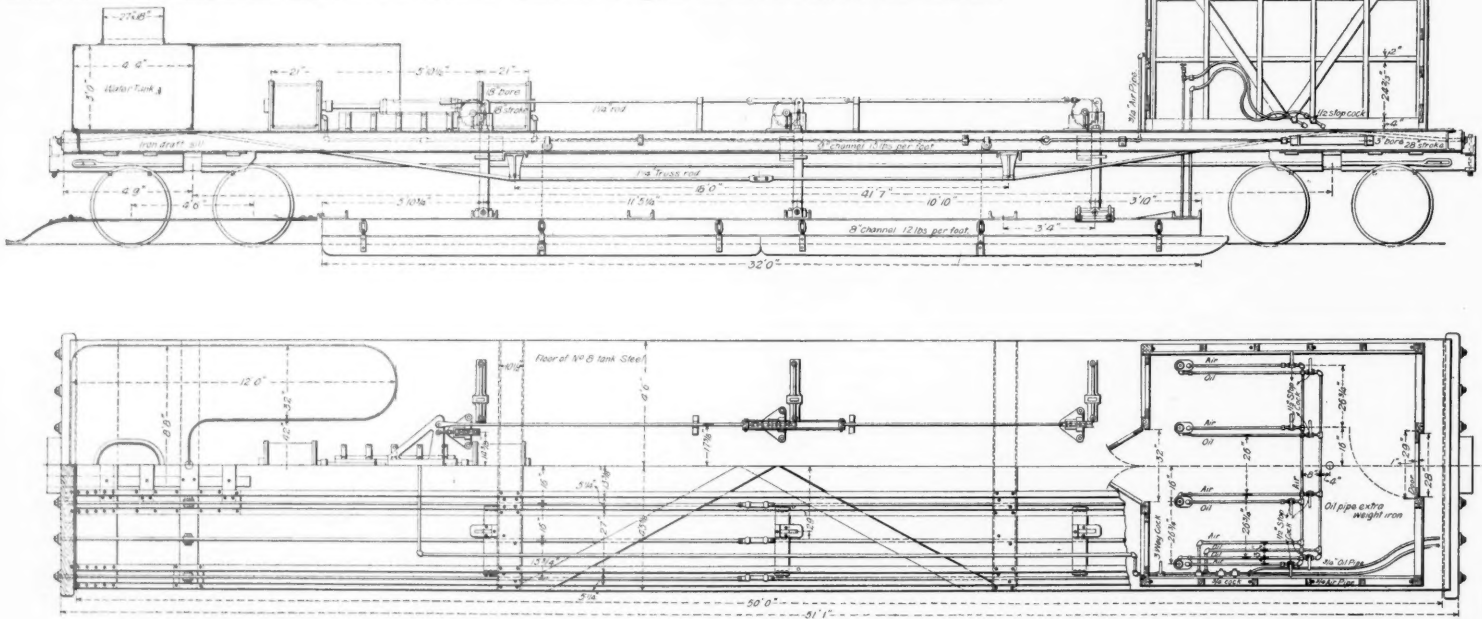
When the fire is started the shield is lowered to within three or four inches of the rail, and the aprons on the side of the shield then slide on the ground. When crossing bridges the shield is lifted to clear the rails 12 or 15 inches. This is readily done by air pressure from the reservoir, acting in the horizontal cylinders on the deck of the car, and lifting by means of chains and pulleys as shown. The oil supply is shut off in crossing bridges. The moment the oil valves are closed the flame is extinguished, and it is as readily renewed when the oil valves are opened. The oil is directed against the inclined under surface of the shield, which retains sufficient heat to ignite the oil even after it has been shut

burners may probably be arranged so that greater speed may be made.

Four burners will spread the flame the full width under the shield and aprons, 9 ft. to 10 ft., and for 15 ft. lengthwise; with such a fire the heat escaping from under the shield has burned green oak end-sill and draft timbers a distance of 30 ft. from the burners.

The cost of operating a car for a day of 12 hours is \$50. If there are no delays, 30 miles can be covered, making the cost per mile \$1.66. With proper care an average of 20 miles a day can be made at an average expense of \$50 a day, or \$2.50 per mile. The oil used is a small part of the expense; the important thing is to keep the outfit moving, making the necessary changes from one division to another. The car has covered over 1,500 miles this season; on some parts of the line it is now on its third trip. After each burning a different kind of grass and weeds has grown. The engineer on the locomotive has an important duty to regulate the speed according to the conditions of the weeds and grass; if thin, he increases the speed; and the contrary if heavy. The approximate cost of burners, oil tank and the additional pumps on the locomotive was \$1,800.

We are indebted to Mr. George A. Hancock, Assistant



Car Fitted with Apparatus for Burning Weeds—Atchison, Topeka & Santa Fe Railway.

The intense heat is deflected to the ground by the inclined surface of the under side of the shield.

The outfit consists of a car made of iron; an iron shield suspended under the car and between the trucks; an oil tank car, capacity 4,500 gallons; and one oil tank of 800 gallons' capacity of sufficient strength to withstand a pressure of 70 lbs. per square inch. This tank is filled from the tank car and air pressure is applied for forcing oil to the burners. The car, which is 50 ft. long, is strengthened by king post trusses at each side, not shown in the drawing. There is a metal roof or awning over the tank and air cylinders at the forward end

off for half an hour. In crossing small culverts and cattle guards the closing of the oil valves is unnecessary the lifting of the shield will carry the flame high enough to prevent any risk of firing the timbers.

The compressed air for forcing the oil through the burners and for lifting the shield is supplied by two 9½-inch Westinghouse air pumps, these being sufficient to maintain an air pressure of 70 lbs. with four burners in use. The amount of oil required for each burner is about eight gallons per mile. A light crude oil is better adapted for this purpose than a heavy thick oil. The burner does better work after being in use half an hour,

Superintendent of Machinery, and designer of the car, for the foregoing information. There are patents on the apparatus.

Anchorage for the New East River Bridge.

The specifications and drawings for the cable anchorages of the new East River Bridge have recently appeared, and the Commissioners will receive bids on Sept. 22. The work contemplated under the specifications, which are separate for each structure, consists of building an anchorage complete between Mangin and

Tompkins streets, in New York; and a like work between Kent and Wythe avenues, in Brooklyn. The designs for the masonry of the two structures are not quite alike, but so nearly so that we have selected only the drawings of the New York anchorage as typical plans for reproduction.

The work to be done in New York will consist of making an excavation of the general plan shown in Fig. 1. This will be dug to a depth of 18 ft. below mean high-water mark through the soft silt which is found in the locality, where borings have been made. It will be somewhat larger than the foundation, which measures 151 ft. 9 in. along the axis of the bridge and 178 ft. 3 in. in greatest width. The sides of the excavation will be supported by sheet piling properly braced. In the bottom of this excavation, yellow pine piles not less than 10 in. at the smaller end or less than 14 in. at the cutoff, will be driven with a 4,000-lb. hammer through the underlying clay until the penetration from a blow of the hammer falling 15 ft. is not greater than 2 in. The heads of the piles will then be cut off 1 ft. above the bottom of the excavation. Then the excavation and the space around the pile heads will be filled with 3 ft. of concrete, in which will be bedded 12 x 12-in. yellow pine timbers laid 5 ft. centers. These timbers will be laid level and at right angles to the axis of the bridge, their tops coming flush with the top of the concrete. On top of the concrete and the imbedded timbers a grillage will be built, consisting of three courses of 12 x 12-in. yellow pine timbers, with a top course of 10 x 12-in. and 8 x 12-in. timbers, alternating and laid with the greatest dimension horizontal. Each course will lie at right angles to the course next below, and all will be drift-bolted together and to the timbers bedded in the concrete with 1½-in. drift bolts, 22 to 30 in. long, driven into 1-in. holes.

On the platform thus made a bed of concrete will be laid. This will be substantially 14 ft. 2 in. thick, its upper surface coming 2 ft. above mean high-water mark. At the rear end of this bed of concrete, three chambers will be left to receive the anchorage girders for the cables. The interior of the cavities will be covered with a waterproof coating of asphalt.

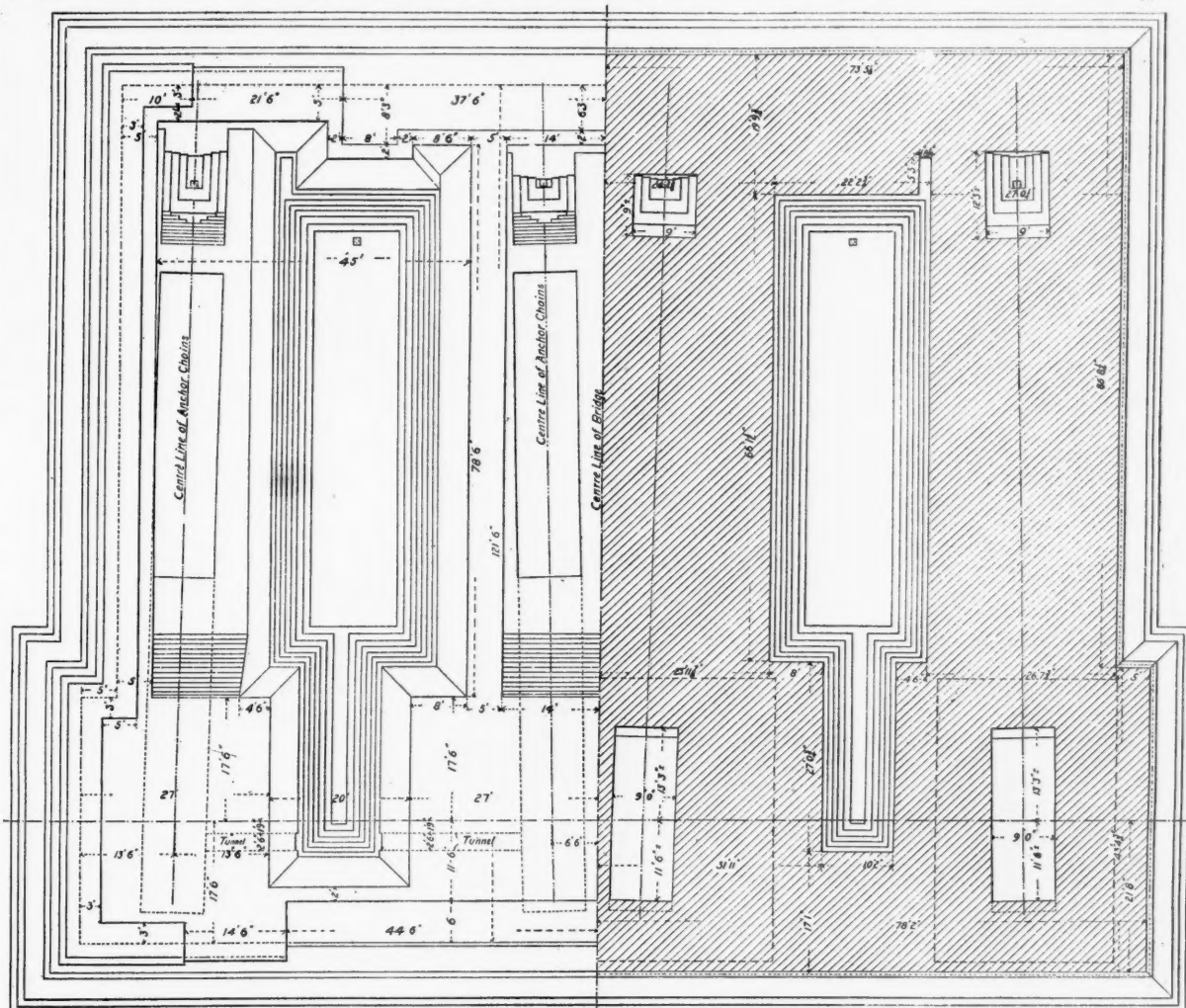
On top of the concrete the regular masonry of the anchorage will be built. Figs. 2, 3 and 4 show the general form of this and of the supports and the chambers for the chains. The masonry will not be solid throughout, but there are several chambers and wells left in it, as shown. The tunnel containing each pair of anchor chains will have vertical walls parallel to the chain and 9 ft. apart, with not more than 1½-in. rock face. The top of the tunnel will not come nearer than 30 in. to the metal at any point of the chain. Across the tunnel, at the points where the joints in the curved part of the upper chain come, plate girders will be inserted. These vary from 20 in. to 5 ft. in depth, depending upon their positions, and they will be supported at their ends on granite blocks dressed to special shapes.

The face stone of this masonry from 4 ft. below the surface of the ground up to the copings will be of granite, while that for backing may be of any stone that has a large specific gravity and great strength and durability. The masonry will be laid in regular courses and thoroughly bonded throughout. The courses will be from 2 ft. 6 in. to 2 ft. thick, except in a few cases, the thickest course being at the bottom and the others decreasing in thickness from bottom to top. The stones of one course will overlap those of the next below 15 in. or more. Above the moulded base and up to the cornice the work will be rock-faced. Every second or third stone of each course will be a header. The vertical joints in the face masonry will be full and square to the face, and for 12 in. back of the pitch lines they will be ½ in. in width, while they will not open over 2 in. at any point. The bed joints will be ½ in. throughout. The beds and vertical joints of coping will be ¼ in. for at least 1½ in. back of the face, while the remainder of the joints will not be more than ½ in. thick. The course next below the coping will have the outer stones clamped with cast steel clamps, and the face stones of the coping will be dowelled to the course below with 1¼-in. steel dowells extending 6 in. into each stone. Face joints will finally be cleaned out to a depth of 1½ in., and pointed in mild weather with mortar made of

equal parts, by measure, of Portland cement and sand, which will be driven in hard with a calking iron. The surface of the joint will then be rubbed smooth with a rounded tool.

The concrete will consist of machine-broken limestone or trap rock, of not more than 2 in. in greatest dimension, mixed with smaller stones, of not less than ¼ in. in

immersed in water 6 days, shall have a tensile strength of at least 150 lbs. per sq. in. Pats of neat cement set in air and then immersed in water shall show no checks or cracks. All Portland cement must be fresh and finely ground. At least 90 per cent. must pass through a sieve of 10,000 meshes per sq. in. The test for tensile strength will not be considered final or conclusive in de-



Half Plan of Top.

Half Section at Top of Base.

Fig. 1.—Top Plan and Section of Masonry—New York Anchorage, New East River Bridge.

least dimension. The broken stone will be washed clean and thoroughly mixed by machine with sufficient mortar to flush all voids between stones, but the proportion of stone and mortar shall not exceed six parts to three by measure. For all concrete and masonry the mortar used will be made of 375 lbs. of cement to 8½ cu. ft. of sand. The cement will be an approved brand of Port-

termining the character of any cement. Uniformity in quality is desired.

As will be seen by the figures, the end of each cable will be held by two anchor chains. The lower ends of these chains are held by an arrangement of plate girders placed in the cavities in the concrete foundations, as shown in Fig. 5. The general plan of these girders is

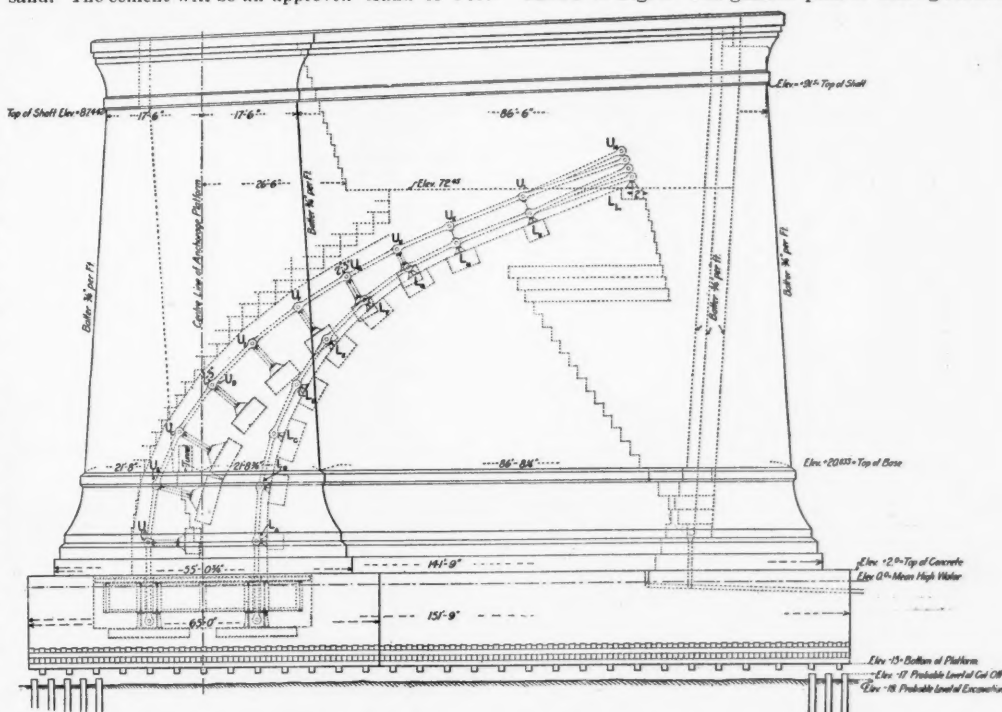


Fig. 2.—Side Elevation of Masonry Showing Position of Anchor Chains, Girders, Bearings and Tunnel—New York Anchorage, New East River Bridge.

land, of such a quality that when briquettes of neat cement are exposed in air for 24 hours and then immersed in water for six days they must have a tensile strength of at least 350 lbs. per sq. in. Briquettes mixed of one part cement to two parts dry sand by weight, exposed in air for 24 hours and then

shown in Fig. 6. The anchor chains for each outside cable have a separate arrangement of girders placed in the outside chambers seen in Fig. 4, while the chains for both inside cables are held by the one system placed in the central cavity. The girders of each set are made with ½ or ¾-in. webs and with top and bottom

flanges and stiffeners, and all are joined by rivets and angles. The girders vary from 5 ft. 6 in. to 5 ft. 11 in. in depth, over all. Placed under two-header girders of the system, where each chain is held by the girders, there is an anchor plate, as shown at L_1 and U_1 in Fig. 5. This consists of a casting with a base 10 ft. long \times 4 ft. 9 in. wide, divided into 20 compartments for the reception of each eyebar forming the end of the chain. The bottom of this casting rests upon a series of 20-in. I-beams underneath the anchorage girders, while the top, which is 9 ft. 4 $\frac{1}{2}$ in. long and 4 ft. 1 $\frac{1}{2}$ in.

will be ribbed castings 1 ft. high, with a finished top 9 in. wide. Each casting will weigh about 2,450 lbs. There will also be castings on the granite blocks under the ends of the anchor chain girders which lie across the chain tunnels, as seen in Fig. 2. These pedestals will also be ribbed castings of different forms. Their weights will vary from 750 to 2,570 lbs.

All of the steel used in the anchorages will be open-hearth acid, with less than 0.1 per cent. of silicon; of phosphorus, less than 0.05 per cent.; of sulphur, less than 0.03 per cent., and of manganese, less than 0.5 per

minimum strength of 47,000 lbs. per square inch, an elastic limit of 30,000 lbs. per square inch, with an elongation in 8 in. of 25 per cent. All steel castings, which are to be thoroughly annealed, must have a minimum ultimate strength of over 60,000 lbs. per square inch, and a minimum elongation in 2 in. of 20 per cent. Four extra eyebars, two 9 ft. 11 in. long and two 10 ft. 6 in. in length, will be made for testing. These, when tested, must have an ultimate strength of at least 60,000 lbs. per square inch, an elastic limit of at least 35,000 lbs. per square inch, and an elongation of at least 15 per cent. of the original length of the parallel portion of the bar for bars of from 9 ft. to 12 ft. long. The steel for angles and plates, eyebars and rolled beams when bent cold 180 deg. about a diameter equal to the thickness of the specimen shall show no crack on the convex side, while steel for pins when bent cold 180 deg. about a diameter one and one-half times their thickness shall show no crack on the convex side. Specimens of rivet steel when bent cold to closing upon themselves shall show no crack. A rod $\frac{3}{4}$ in. in diameter, nicked one-quarter of the way through, shall bend cold to closing without cracking with the nick on the convex side. Eyebars will be uniformly annealed by being heated to a dark red and then slowly cooled after forging. The bars of each set will be bored to the exact length required, the holes having diameters not to exceed $\frac{1}{16}$ in. greater than those of the pins to be used in them, and their length must be so exact that the whole set when packed closely together will allow the proper pins to pass through all the eyes at both ends simultaneously without binding.

At the site of the Brooklyn anchorage the present elevation of the ground is about 25 ft. above mean high-water level. An excavation over the whole area of the anchorage, which will be the same in plan as the one on the New York side of the river, but measuring 158 ft. along the axis of the bridge and 182 ft. in greatest width, will be made to a depth of 11 ft. 6 in. below mean high water. The rear part of this excavation, a little more than half the area of the plan, will be made 4 ft. deeper, being sunk to a depth of 15 ft. 6 in. below 0 elevation, that is mean high-water level. Piles spaced 3 ft. centers will then be driven in three places in the bottom of this deeper excavation, coming substantially under the three chambers for the reception of the anchorage girders. These will then be cut off at an elevation 16 ft. below mean high water, and the material around and between them dug away 1 ft. below cutoffs. This space and for a height of 18 in. above the bottom of the excavation is to be covered with a bed of concrete, 12 x 12-in. timbers being embedded in it, as in the case of the New York anchorage. A yellow pine grillage is to be then built on this concrete. The top of the plate form will be at two different elevations, the rear part, about half, being at an elevation—10 ft., while the front part is 4 ft. higher. This grillage will be drift-bolted together the same as the other, and the top course will consist alternately of 10 x 12-in. and 8 x 12-in. timbers.

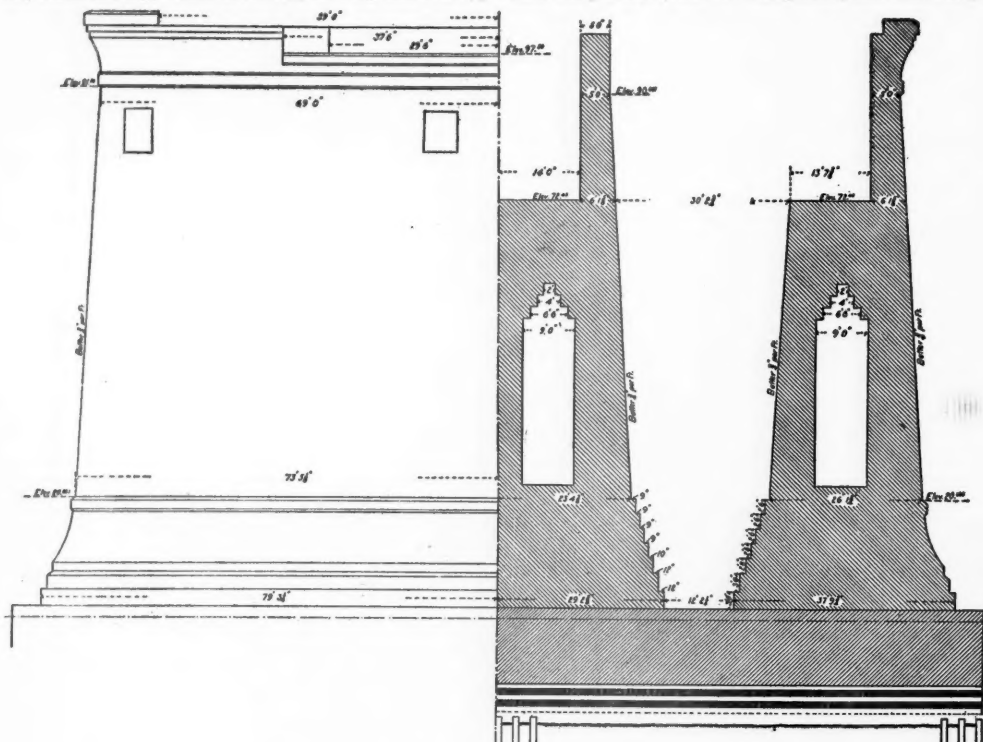


Fig. 3.—Front Elevation and Section of Masonry.

in. wide, comes in contact with the underside of the anchorage girders. A 6½-in. hole passes through the whole series of partitions forming the compartments for the end of the chain. This is for the bolt which will pass through the end eyebars of the anchor chains. The casting is 2 ft. 8½ in. high and weighs approximately 11½ tons.

Each anchor chain will be made of eyebars all 9 in. wide and of thicknesses of 1½, 1¾ and 2 in., and 14 ft. 6 in., 10 ft. 6½ in. and 9 ft. 11½ in. long. The sections of each chain will consist alternately of 19 and 20 of these bars placed side by side and joined together by a 6½-in. bolt passing through the eyes at the ends. These bolts, which are of an average length of about 6 ft. 6 in., have

cent. Less than 0.3 per cent. of manganese is preferred. Carbon will be between 0.15 and 0.25 per cent. The maker will have to furnish an analysis of every melt. Physical tests of steel will be made on specimens furnished by the contractor. For this purpose the steel will be divided into six grades. That for angles and plates, which, when tested in specimens of $\frac{3}{8}$ -sq. in. section, cut from shapes, shall have a maximum ultimate strength of 68,000 lbs. per square inch., a minimum ultimate strength of 60,000 lbs. per square inch, a

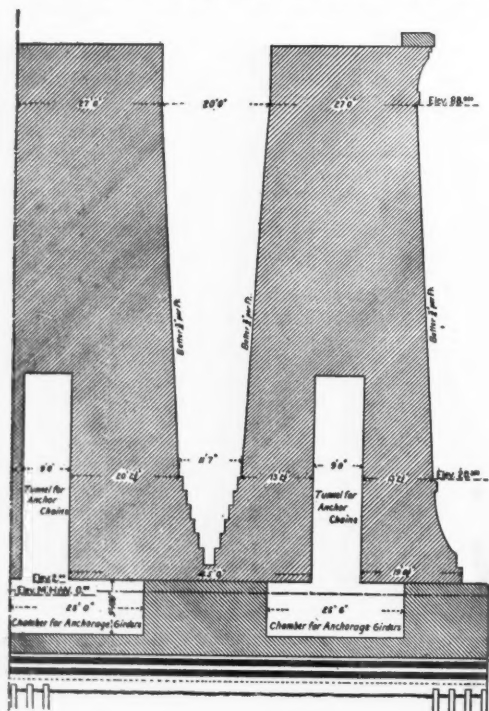


Fig. 4.—Transverse Section on Center Line of Anchorage Platform.

a 1½ in. hole drilled longitudinally through the center, through which the 1½-in. bolt passes which clamps the bars together by means of die-forged washers at its ends. The arrangement of the upper or cable end of a pair of chains is shown in Fig. 7. The estimated weight of the eyebars and pins in one anchorage is 8763 tons.

On the granite blocks under each pin joint in the lower chain there will be a knuckle plate, as seen in Fig. 5, with a base 7 ft. long and 2 ft. wide. These plates

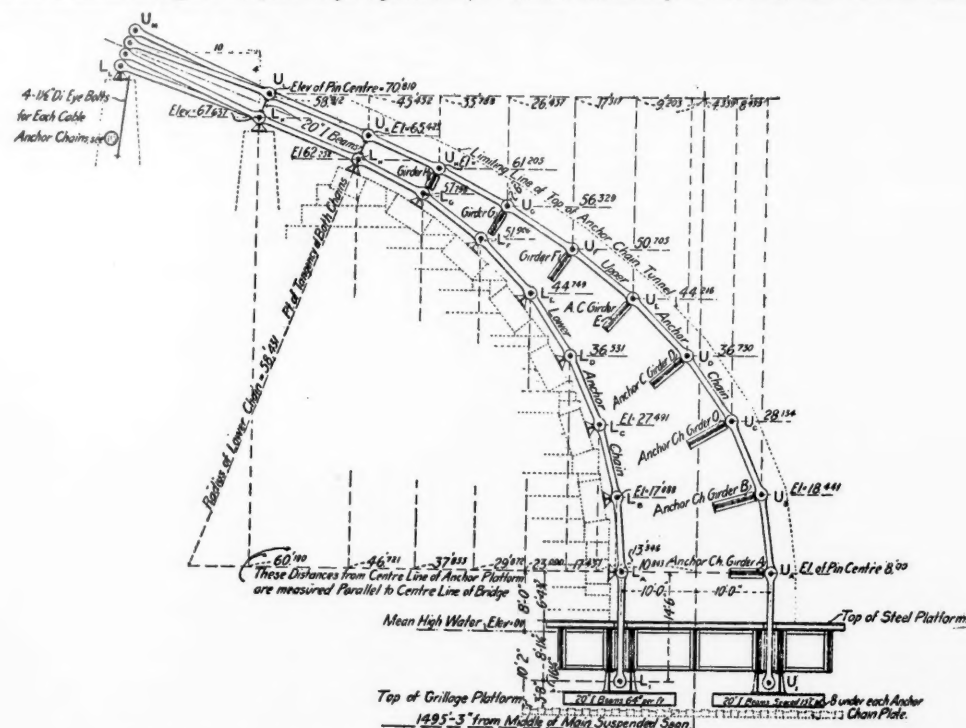


Fig. 5.—General Arrangement of Anchorage Chains and Girders, New East River Bridge.

minimum elastic limit of 33,000 lbs. per square inch, and a minimum elongation in 8 in. of 20 per cent. The grade of steel to be used for eyebars shall have a maximum strength of 72,000 lbs. per square inch, a minimum strength of 64,000 lbs. per square inch, an elastic limit of 35,000 lbs. per square inch, with an elongation in 8 in. of 20 per cent. Steel for pins is not limited in maximum strength, but in minimum it must not fall below 68,000 lbs. per square inch. Its elastic limit will be the same as in the last case, while its elongation in 8 in. must be over 17 per cent. The steel for rolled beams will be the same as that for angles and plates except that its elastic limit will be 32,000 lbs. per square inch. Rivet steel must show a maximum strength of 56,000 lbs. per square inch, a

Concrete will be placed on this timber platform up to high-water level, with girder chambers built and lined the same as described. On top of this bed of concrete, the top of which will be level, the anchorage proper, of coursed-stone masonry, will be begun. This anchorage will be substantially the same as that to be built in New York, the anchor chains, anchorage girders, etc., being exactly the same.

The earth excavation in Brooklyn, if the sides be sheeted vertically, will be 34,000 cu. yds. There will be 1,710 cu. yds. of concrete below the timber platform, and 8,740 cu. yds. above the deck to 0 elevation. There will also be 435 cu. yds. that will replace masonry above the deck beams at the top of the anchorage girders.

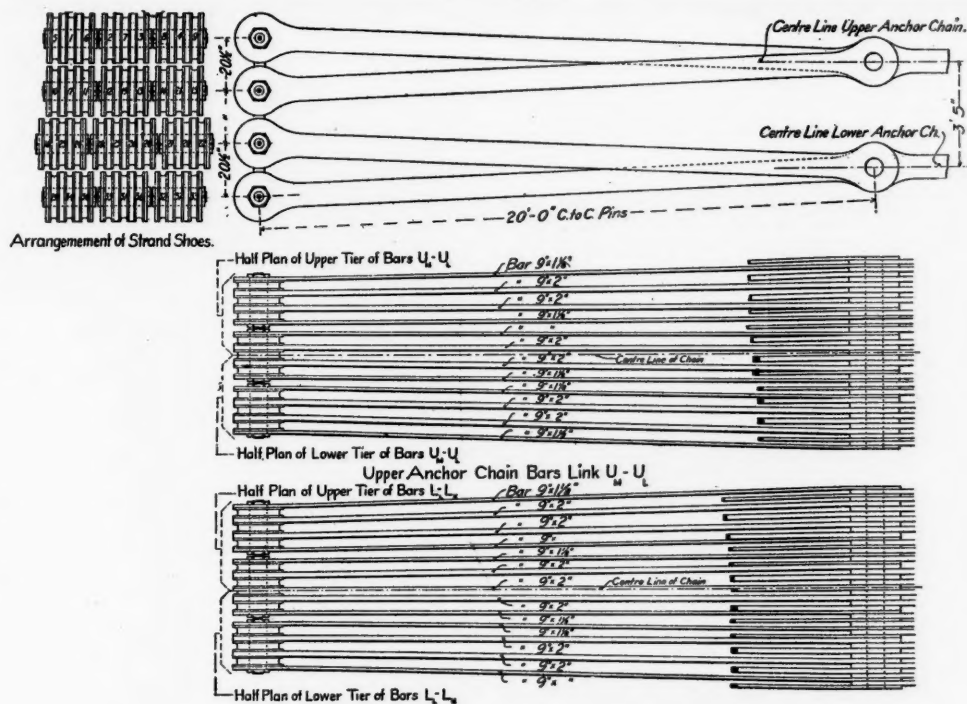
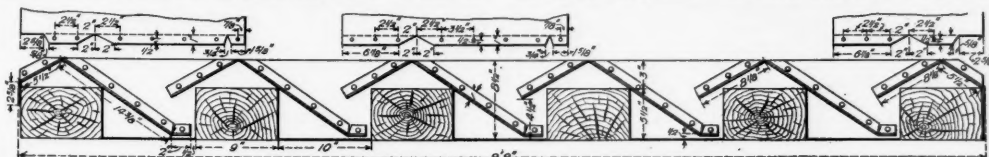


Fig. 7.—Anchor Chains for New East River Bridge.

making a total of 10,885 cu. yds. There will be 432 piles required. The timber platform will require 120,000 cu. ft. of yellow pine and 67 tons of drift bolts. There will be 44,597 cu. yds. of stone masonry in the anchorage, 876 tons of steel in the anchor chains, 474 tons in the girders, and 208 tons in the castings, a total of 1,553 tons of steel.

The bids will be based upon the whole work to be done. Where piles are required they will be paid for

line, and the shrouds turned. The engine is 11 in. x 15 in. of very substantial design and securely bolted to the main frame. There is an automatic stop so that the sliding head can be brought to rest automatically at the top of the stroke. The small cylinder on top of the main frame is for counterbalancing the head by means of compressed air or steam, which is admitted to the under side of the piston. This does away with awkward



The "Perfect" Surface Cattle Guard.

per pile as indicated in the form of proposal, and the Commissioners will hereafter indicate the amount of pile driving to be done. After the masonry is built to the level of the last joints of the chains next to their upper ends, work upon it will cease, at least on that portion nearest the river, and this cannot be resumed until the cable strands are completed and fully adjusted in place.

In our issue of July 31, 1896, we gave a description and general plan of this bridge; and again, on May 28, of this year, we illustrated and described the work to be done on the foundations for the Brooklyn tower.

A New Surface Cattle Guard.

The Kalamazoo Railroad Velocipede & Car Co., of Kalamazoo, Mich., is now introducing a steel surface cattle guard, somewhat different in principle from those now in use. The common idea seems to be that a surface cattle guard to turn animals must present a series of jagged points and on one Western road there is in use a guard where ordinary barbed fencing wire is strung along the ties parallel to the rails. The surface guard here shown is intended to avoid injuring cattle in this way. There being no sharp projections, this makes it easier for trainmen or section-men to cross.

At the first step an animal's foot slides forward and is directed by the inclined planes into one of the pockets. The forward step is then prevented as the foot is held down by the front plate which brings a pressure just above the ankle while at the same time the foot is free to be withdrawn.

This guard is known as the "Perfect" and is made in three sections, one 50 in. wide covering the space between the rails, while sections, each 22 in. wide, are used outside the rails. Each section consists of two side plates of No. 8 open-hearth steel and six parallel sheets of No. 13 steel, flanged as shown, and riveted to the side plates. The side plates are cut to fit over the sleepers, and are secured to them by spikes at the ends of the sections. These guards are given two coats of paint, applied with a brush, before leaving the shop.

We are advised that these cattle guards have given satisfaction on railroads in the South and West, where they have been used.

A Heavy Bar Shear of Recent Design.

The accompanying engraving shows a recent design of a heavy bar shear when driven by an engine. This machine, which is now being made by the Hilles & Jones Co., of Wilmington, Del., is intended especially for shearing plates up to 24 in. as well as for the shearing of billet work, and is equal to shearing 4 in. x 4 in. hammered billets cold. It will be noticed that the tool is very compact with bearings well supported; gearing is large and substantial, spur wheel being shrouded to the pitch

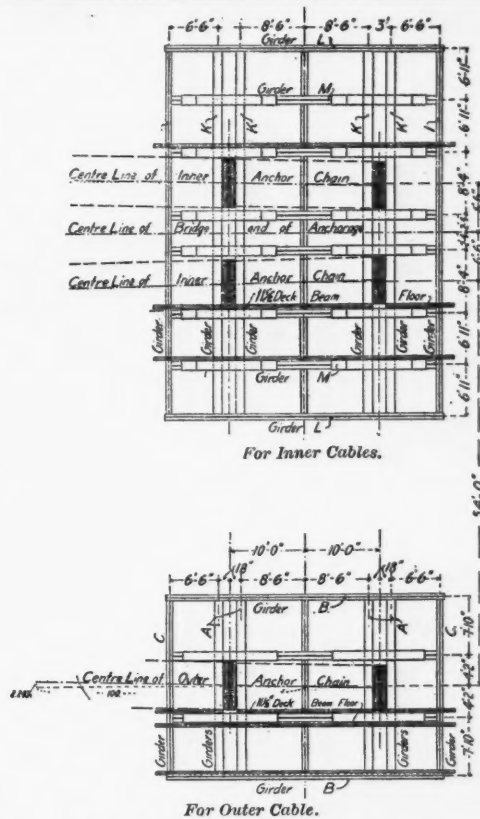


Fig. 6.—Arrangement of Anchorage Girders.

Carlsbad were robbed of over \$20,000 by thieves who entered the car and chloroformed every occupant.

The development of coal production in Austria during the past 10 years resembles that of some of our newer mining districts. The coal production increased from 10,759,196 metric tons in 1886 to 28,111,825 in 1895—161 per cent. Nearly two-thirds of the present production is lignite, an inferior but still valuable fuel. A great part of this lignite (chiefly produced in Bohemia) is exported, while Austria imports almost as much stone coal as it produces. One little railroad carried 8,290,000 tons of lignite in 1896, against 3,870,000 in 1886. Coal made up nine-tenths of its freight.

Prices of Car Couplers.

In accordance with the instructions contained in the Rules of Interchange for 1897, the Secretary of the Master Car Builders' Association has just issued the September price list of couplers and coupler parts. The list contains prices on 33 different makes of couplers. The Burns, Edwards, Empire, Eureka, Gifford, Interstate and Johnston coupler companies were asked to quote prices, but did not do so.

Foreign Railroad Notes.

A press dispatch states that a few days ago the passengers in a sleeping car between Vienna, Austria, and



Hilles & Jones' New Heavy Bar Shear.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The Interstate Commerce Commission has "recommended" a reduction of freight rates on the Eureka Springs Railway, as will be seen by a decision, prepared by Chairman Morrison, which is reported in the traffic columns of this paper. Thus, after 10½ years, the Commission, in abandoning its mandatory way of expressing its opinions and adopting recommendatory language, conforms to the spirit of the law. Any one of the commissioners, acting in his personal capacity, would have made this change long ago, we should think, simply from a sense of the fitness of things, for it is not apparent that the use of judicial verbiage has ever induced obedience to a single order; while such "orders" have been disobeyed so many times that the fact that they were not orders, in any true sense, has become evident to everybody. The changed attitude of the Commission is due, of course, to the decision of the Supreme Court last May (*Railroad Gazette*, June 4, pages 389, 399) to the effect that the Commission could not prescribe rates, and therefore could deal only with past transactions. Chairman Morrison takes occasion, however, to call attention to Section 15 of the Interstate Commerce Law, which requires the Commission, if it finds that injustice has been done—as, for instance, by the persistent maintenance of a rate which is too high—to deliver to the carrier "a notice" to cease such injustice—that is, to cease charging the high rate—within a specified (reasonable) time. The general tenor of this clause of the law indicates that the framers of it contemplated something more than a mere recommendation: and yet the word "notice" is scarcely stronger than "recommend," and when Mr. Morrison interprets it to mean "notify and require," as he does here, he is not likely to convince Judge Brewer that the view of the Supreme Court ought to be changed. At best the law is somewhat ambiguous—which is not to be wondered at, for the men who framed it were beset with conflicting and puzzling views, and, no doubt, inserted some ambiguous clauses intentionally—and, as we have seen, by Judge Brewer's decision, and by some others from the same court, the resulting doubts may well be settled in favor of the established order of things. To decide the other way would produce radical changes, which the courts rightly declare must be left to the legislative branch of the government.

British Railroads for 1896.

Inasmuch as Great Britain is by all odds the most important customer for our exports of domestic products (the United Kingdom takes as much of our surplus as all the rest of the world together) we ought to be rejoiced at every evidence of prosperity in the British Islands. Even the most credulous disciple of the tempestuous and talkative Morgan must see that the more money our best customer has the better for our trade. For this sordid reason, if for no higher one, it is a pleasure to take up the blue book of *Railway Returns* for England and Wales, Scotland and Ireland for the year

1896, which has recently been issued. We learn here that the aggregate earnings of the railroads of the United Kingdom were greater than for any other year in their history. This is true also of the net earnings, of the number of passengers carried, of the tons of freight carried and of the gross earnings and net earnings per mile of line worked, which latter is indeed a very remarkable outcome.

In taking up the figures of this report somewhat specifically we shall make occasional comparisons with the results of railroad working in the United States, although, unfortunately, our statisticians have not yet given us the results for 1896.* Therefore, the comparison will be between the railroads of the United Kingdom for the year ending Dec. 31, 1896, and the railroads of the United States for the year ending June 30, 1895.

The total miles of railroad open for traffic at the end of 1896 in the United Kingdom was 21,277, which was but 103 miles more than in 1895 and only about 1,000 miles more than in 1891. Of this, 11,589 miles (54½ per cent.) had two or more tracks; the rest, 9,688 miles, was single track road. In the United States the railroads were 180,657 miles, of which less than 11,000 miles, or about 6 per cent. of the total, was double track or more than double track.

The miles of railroad for each 100 square miles of territory in the United Kingdom amounted to 17.2; in the United States there were 6 miles of railroad for each 100 square miles of area. The miles of railroad for each 10,000 inhabitants in the United Kingdom amounted to 5.3 and in the United States to 26.6. We see thus that each mile of British railroad had 1,900 people to support it, while in the United States there were only 380 people to support a mile of railroad. Furthermore, in the United Kingdom these people were crowded into six square miles; in the United States they occupied 17 square miles. Obviously, the traffic must be much heavier and the profits of railroad working greater in the more thickly peopled and richer country.

The British statisticians do not give passenger miles or ton miles, and therefore we can make no comparison of these units of traffic. The revenue train-miles run on the railroads of the United Kingdom in the year were 353,406,000, which is equivalent to 23 trains, each way, over every mile of railroad in the Kingdom every day. In the United States the revenue train movement was only 6½ trains per mile per day. The gross traffic earnings per mile of the British railroads (not the total income) amounted to \$19.48, and in the United States to \$6.050.†

In order to make a comparison on somewhat more equal conditions we will take the roads of England and Wales alone and compare them with those of Groups 1 and 2 of the Interstate Commerce Commission, these groups including the New England and Mid-States. We find that these English railroads earned \$23.863 gross per mile from traffic alone, and the American roads \$13.000.

The net earnings of all the railroads of the United Kingdom amounted to \$9,253 per mile and of all the railroads of the United States to \$2,712.

We have said that the year was one of great prosperity for the British roads. In fact the gross earnings from all sources for the year amounted to about \$438,000,000, which was an increase of 4.9 per cent. over the preceding year and was the greatest absolute earnings for the whole system ever made. The net earnings were \$195,000,000, an increase of 5 per cent. over the preceding year. The passenger earnings increased 4.7 per cent. and the freight earnings 4.9 per cent.

The total paid-up capital of the railroads of the United Kingdom amounted to £1,029,475,335 or \$236,000 a mile, of which 72 per cent. was in common, guaranteed and preferential stock; 27 per cent. was debenture stock (corresponding to our bonded debt), and the rest was loans. The total debt per mile of the railroads of the United States amounted to \$63,206 according to the Interstate Commerce Commission, or but little more than one-fourth that of the British roads, and the aggregate capitalization for all of our railroads was 10,964 million dollars. Of this 45 per cent. was stock, 49 per cent. funded debt and six per cent. floating debt.

The net receipts of the railroads of the United Kingdom amounted to 3.88 per cent. on all the paid-up capital. About 5½ per cent. of this capital received no interest. On the other hand, the dividends paid on the railroads of the United States amounted to but 1.7 per cent. on the total capital stock (Poor makes it 1.54 per cent. in 1896), and in the United States 70.06 per cent. of the stock paid no dividends

* Since this was written we have received Poor's Manual for 1896; but we need not revise the figures.

† In converting pounds to dollars we have taken each pound at \$1.87.

whatever, and 16.71 per cent. of the funded debt received no interest.

From this comparison we might draw several conclusions, as for instance that the United States has too many railroads for its population, or that the rates in the United States are unreasonably low. But we refrain, merely suggesting that the railroads of England seem to be a fairly efficient, economical and remunerative machine of transportation in spite of their great cost—perhaps partly because of it.

The Counterbalance Tests of the Strong Locomotive.

Mr. Geo. S. Strong, in his letter published in our issue of August 13, took exceptions to a statement made in a previous issue regarding the tests of the Strong balanced compound locomotive at Purdue University. In mere matters of opinion little can be gained by present discussion, and we shall not attempt to deal with such portions of the letter, merely remarking that some Superintendents of motive power have a way of making very broad statements offhand, but when they are asked to put themselves on record they become extremely cautious. Such general remarks as Mr. Strong quotes should seldom be taken seriously. The statements regarding compound locomotives are quite different from those heard when the subject was up for discussion at the last meeting of the Master Mechanics' Association.

Leaving out, therefore, all reference to opinions and quotations from unknown parties, the first point is that of the recent tests of the balanced engine at Purdue. In speaking of the relatively small practical value of these, we did not say that the question of counterbalancing was not important. It is, however, quite safe to say that the investigations made in the last few years have shown that for all practical purposes the counterbalance question is settled until the conditions governing locomotive practice are radically changed.

In referring to the counterbalance tests of Schenectady No. 1, at Purdue, Mr. Strong has made an error. These tests were described in a paper by Professor Goss, read before the American Society of Mechanical Engineers, December, 1894. That paper gives the excess balance in the main driving wheel as 204.5 lbs. and in the rear driving wheel 400.8 lbs., which latter figure Mr. Strong has taken to be the excess balance on one side of the engine. The Purdue engine was in perfect balance horizontally, a condition not to be found in road practice. This was necessary because of the construction of the old Purdue testing plant. The new plant, now in operation, does not require the locomotive to be in complete horizontal balance.

Instead of "the excess balance on each side of the engine being 400 lbs.," the excess balance in the rear driver alone was 400.8 lbs. and Professor Goss, in the same paper, says that comparing with the six different rules in common use for balancing locomotives for the road, the relative weights of the counterbalances in the Purdue engine appear as follows:

	Main driver.	Rear driver.
By rule A, for freight service only.....	17.8% too heavy	107.6% too heavy
By Rule B, for all classes of service.....	19.1% " "	67.6% " "
By Rule C, for all classes of service.....	0.6% " "	56.9% " "
By Rule D, for all classes of service.....	3.5% " light	56.9% " "
By Rule E, for all classes of service.....	4.0% " "	47.5% " "
By Rule F, for all classes of service.....	6.4% " "	41.6% " "
By the average of five rules from B to F inclusive.....	0.4% " heavy	54.2% " "

In view of the fact that the rear driver which, if on the road would have been considered very badly balanced was lifted from the supporting wheels; and that the main driver, which was counterbalanced in accordance with the common rules, did not leave the supporting wheels, Mr. Strong's remark about compound engines with 800 lbs. excess on one side will not appear so alarming.

Professor Goss says: "It will be seen that the wire from the main driver shows but slight variation in thickness, notwithstanding the high speed (312 revolutions a minute) and it may be said that no wire was ever obtained from this wheel which gave evidence that the wheel left the track. From mathematical considerations it can be shown that this wheel should not be expected to lift at speeds below 80 miles an hour (428 revolutions per minute)." It might also be said that the diagram, shown by Professor Goss, of a wire taken from the main driver at a speed of 58.3 miles an hour (312 revolutions a minute) shows no greater variations in thickness than the ones we have seen from the Strong balanced locomotive. The pressure of the steam on the piston, as the engine was run in forward motion, always ex-

erted a downward pressure on the main driving wheel, but this pressure would not be sufficient to account for the wide difference in the wires from the main and rear drivers.

It is quite possible that there are two-cylinder engines in use in this country where the excess balance on the low-pressure side is 800 pounds. Assuming that on these engines the excess is two-thirds the total weight of the reciprocating parts, the weight of such parts would amount to 1,200 pounds. Now the total weight of the reciprocating parts on the low-pressure side, with pistons 30 inches in diameter, of express and freight engines used by the London & North Western, is between 730 and 780 pounds, which is merely an example of English practice in this regard. Still Mr. Strong asserts that American designers have reached the limit in the matter of reducing the weight of the reciprocating parts.

A ten-wheel, two-cylinder, compound locomotive recently built has the following dimensions: Cylinders 20 in. and 32 in. in diameter by 24 in. stroke, total weight 134,300 lbs., weight on drivers 103,100 lbs., diameter of drivers 66 in. If we take Mr. Strong's figure and assume that on the low-pressure side of this engine, 800 lbs. is the portion of the reciprocating parts required to be balanced, and if each side of the engine were balanced independently of the other, an excess of 267 lbs. would be required in each driver on the low-pressure side. The weight on each driver of this engine is 17,183 lbs. The Committee on Counterbalancing, in its report to the Master Mechanics' Association in 1896, fixes the limit to the amount of excess balance which may be put in each wheel as follows, assuming the maximum speed in miles per hour to be equal to the diameter of the driver in inches. We quote from the report: "In order that the wheel shall never leave the rail, 40 times the portion of the weight of the reciprocating parts added to each wheel must not exceed its static pressure on the rail. To insure safety it should not exceed 75 per cent. of such pressure." Applying this rule to the case in hand, 40 times the excess in each wheel would be 10,680 pounds and 75 per cent. of the static pressure of each driver is 12,887 pounds, so that our weight is 2,207 pounds inside the safe limit.

At the last meeting of the Master Mechanics' Association the Committee on Counterbalancing reported that the rules laid down the year before had worked satisfactorily when applied to engines in service. As the former recommendations were confirmed, it is probably practicable to have as much as 800 lbs. excess on a side for engines similar to the one for which dimensions are given above, without the drivers lifting from the rail at speeds for which they are adapted and designed. In this connection it might be said that in balancing two-cylinder compound locomotives it is usual to put a portion of the excess balance for the low-pressure reciprocating parts in the drivers on the high-pressure side of the engine, as a better riding engine is thus obtained. The new two-cylinder compounds for the Northern Pacific are so balanced. These are used on a portion of the road where the rails weigh only 56 lbs., and the rails have not been kinked or apparently damaged by the excess balance.

Applying the same limiting rule to the rear driver of Schenectady No. 1, which lifted from the supporting wheel at a speed of about 60 miles an hour, we find 40 times the excess balance equals 16,000 lbs., while 75 per cent. of the static pressure on this driver is 10,500 lbs., so it is very apparent how far outside the limit of approved practice was the balancing of the Purdue engine. The dimensions of this engine are as follows: Cylinders, 17 in. in diameter by 24-in. stroke; total weight, 85,000 lbs.; weight on drivers, 56,000 lbs.; diameter of drivers, 63 in.; weight on each driver, 14,000 lbs.

As we said in our issue of August 6, the subject of locomotive counterbalancing has already been very thoroughly discussed; and while there have been numerous instances of rails and bridges being badly damaged by the excess balance, the damage has always been caused by locomotives badly balanced or by heavy engines with small drivers run at excessive speeds. We know of no instances which would go to prove that an express locomotive, designed according to the best American practice and balanced in accordance with the rules approved by men who have carefully studied the subject, has ever damaged the rails at speeds thus far attained, and so far no good reasons have been presented for making radical changes in the present arrangement of the reciprocating parts. If, however, improvements can be made which will not complicate the moving parts of locomotives or materially increase the first cost, and which can better accomplish the results obtained by present methods, such improvements will receive all the attention they merit. The Strong balanced

engine tested at Purdue University cannot be classed with such improvements.

Designers could save themselves both time and money if they would keep in mind the fact that those who have charge of the maintenance of locomotives are ever striving for *simplicity* in construction. Any scheme which involves greater complication than now exists in the best practice will not be received with favor when some simple, practical arrangement is known which will accomplish the same purpose.

Annual Reports.

Chicago, Milwaukee & St. Paul.—This report, which is for the year ending June 30, shows a considerable falling off in revenue, though not enough to affect dividends. In the past year, as in 1896, seven per cent. was declared on the preferred and four per cent. on the common. The amount required for dividends in the year was \$3,737,450, and although revenue fell off \$2,195,000, the balance after deducting dividends was \$845,000. There was a decrease in all items of income. Passenger revenue fell off \$430,000; freight earnings were \$1,783,127 less, and the aggregate gross \$2,195,061 below the 1896 totals. The percentages of decrease were seven per cent., 7.46 per cent. and 6.7 per cent. respectively. But by a saving of a round million dollars in working expenses the loss in net was just half that reported in gross, or \$1,095,792. The summarized results for three years given below show that 1897 seems a poor year only when compared with 1896, which, because of an exceptional movement in agricultural products, gave the company the largest gross it had ever reported:

Earnings:	1894.	1895.	1896.	1897.
Freight.....	\$21,550,687	\$18,978,263	\$23,387,930	\$22,164,802
Passengers.....	7,311,822	5,852,781	6,147,679	5,717,196
Mail, express, etc.	2,465,412	2,504,325	2,616,220	2,694,169
Gross.....	\$31,327,921	\$27,335,369	\$32,681,829	\$30,486,768
Working Expenses:				
Maintenance of way and structures.....	\$1,169,838	\$3,703,166	\$4,374,724	\$4,334,955
Maintenance of rolling stock.....	2,698,459	2,085,309	2,942,294	2,464,838
Conducting transportation.....	9,621,027	8,318,158	9,102,785	8,475,313
Loss and damage to persons and property.....	444,178	293,432	251,676	229,177
General offices, agencies and advertising.....	1,002,289	966,955	992,679	984,205
Mileage of cars.....	217,181	139,819	183,314	210,257
Taxes.....	1,199,977	1,084,710	1,082,084	1,181,231
Renewal account.....	350,000	200,000
Miscellaneous.....	462,283	421,913	397,351	494,562
Total expenses.....	\$20,114,332	\$17,043,753	\$19,876,898	\$18,777,539
Net earnings.....	\$11,213,619	\$10,291,616	\$13,005,021	\$11,709,229
Average miles w'd.....	6,147	6,159	6,153	6,152

It will be seen that the year just closed has been on the whole a prosperous one. The year just begun promises to make as good a showing as ever before in gross, and net ought to be in excess of any total ever reached in the company's history. In July, 1897, gross earnings were \$167,000 more than in July, 1896; and in August the increase was \$256,000. Dividends have been well maintained through the recent years of depression; the preferred has received seven per cent. each year and the common two per cent. in 1892 and four per cent. in each year since, except in 1895, when two per cent. was paid.

It is interesting to note in passing how the year's results on the St. Paul compare with the exhibit made by the Chicago & Northwestern, which is in many respects similarly situated in its last fiscal year to May 31, 1897. The earnings of the latter road were \$30,977,000, about 2½ millions less than in 1896, when an increase of \$5,380,000 had been reported. Net earnings were \$11,038,000, just about a million below those of 1896, when an increase in net of \$2,243,000 was reported. It will be seen that 1896 was an exceptionally favorable year for both roads. Northwestern's dividends, at the present rate, seven per cent. on the preferred and five per cent. on the common, call for \$3,518,000, and its surplus after this payment was \$1,171,971. The St. Paul's dividend payment was nearly 3½ million dollars, though it paid only seven and four per cent. and its surplus was \$2,707,753. It is seen that although the St. Paul operates 2,700 more miles than the Northwestern proper, the revenues of the two companies are about the same, and that their business has been affected also in about the same proportion by the special conditions operating in the territory where their greatest mileage is located.

The earnings in 1896 on both roads were large because of the good crops of that year; the tonnage of agricultural products on the St. Paul increased, for instance, 1,051,680 tons, bringing the total up to 3,846,426 tons. But general traffic was also much better in 1896, increasing 682,433 tons, or up to 8,363,629 tons. Although we know St. Paul as a granger line, it is worth noting how much larger the general commodity traffic is, 68.5 per cent. of the whole. In 1897 these figures are altered to some extent and therein we find the explanation of the decline in earnings. Agricultural products, as a whole, did not fall off, but the company lost in general traffic. It lost in coal, which is the largest single class of freight (nearly 300,000 tons more than wheat in 1897, and 550,000 tons more in 1896), 202,112 tons; in iron and steel the loss was over 100,000 tons, and there other large losses. The falling off is attributed by President Miller to the general business depression. This is undoubtedly true enough, so that, if the present outlook for prosperous times holds out, the St. Paul ought to more than regain this traffic, besides hauling the immense quantities of

wheat, which the high prices and export demand will send over its lines. The St. Paul, it should be recalled, profits immensely by a good wheat crop. The total agricultural tonnage was 33.5 per cent. of the whole; mineral traffic is 18.5 per cent.; animal traffic, 7.18 per cent., while merchandise is 845,112 tons or 7.31 per cent., and but 194,000 tons below the wheat tonnage. In 1895 the merchandise carried was 187,000 tons more than the wheat, so that although we call the St. Paul a wheat road it is to be borne in mind that several other classes of freight give nearly as heavy a traffic.

The ton-mile rate was better than last year; it was 1.008 cents against 1.003 cents in 1896; but it was 1.075 cents in 1895. Just 10 years ago, in 1887, the rate was 1.009 cents. There was a heavy decrease in ton mileage, 188,426,908, or 7.91 per cent., but something over half as great a reduction was effected in revenue ton mileage, which was 22,385,659 in 1896 and 21,199,466, or 6.8 per cent. less. The saving was entirely in freight train mileage, passenger train mileage, as usual, not proving so easy of regulation. In fact, it was 7,819,919 miles in 1897 against 7,788,709 in 1896, although passenger revenue fell off \$430,000. The saving in freight train mileage was 8.4 per cent., and this with the higher ton-mile rate effected a small increase in freight train mile revenue, which was \$1.6894 against \$1.6758 last year. In the other items of train handling the improvement of the previous year was not maintained, in 1897. The average miles each ton of freight was carried was 189.82 miles, a decrease of 5.24 miles, or 2.69 per cent. The number of tons of freight carried per loaded car was 10.74, against 10.90 last year, a decrease of 1.47 per cent. The number of tons of freight per freight-train mile was 167.02, against 167.08 last year.

In the expenditures pertaining to maintenance of way and structures, there was an increase from the previous year of renewal of rails, \$212,547; repairs of buildings, \$4,161; a decrease of repairs of track, \$14,867; renewal of ties, \$95,558; repairs of bridges, \$119,730; repairs of fences, \$26,320—making a net decrease from the previous year of \$39,768. New rails to the amount of 23,625 tons have been laid during the year, an increase of 1,145 tons over the amount laid in 1896; and 1,880,372 cross-ties have been placed in track, a decrease of 141,434 from the number used in the previous year. The expenditures for repairs of bridges include the total cost of 24 iron bridges, aggregating 3,155 ft. in length, replacing an equal number of wooden bridges; the filling of about 4½ miles of pile bridges with earth, 313 bridges having been completely filled and 116 reduced in length by filling; and the replacing of 130 wooden culverts with iron. The expenditures for maintenance of rolling stock during the year were \$2,464,838, a decrease of \$477,456 from the expenditures of the previous year on this account, and include the amount of \$285,452 charged to repairs of locomotives and cars to replace the loss of equipment during the year, and also general repairs of 247 locomotives and 10,195 cars. In the items pertaining to conducting transportation there was a decrease in expenses of \$627,472.

At the close of the year 33 coal cars, 100 carriage cars and 250 stock cars were under construction in the company's shops for replacement at an estimated cost of \$185,000, and orders have been given for six locomotives, also for replacement, the cost of which will be about \$60,000. There has also been expended during the year for new and additional rolling stock, and for air-brakes and automatic couplers and for other improvements to rolling stock the sum of \$303,230, which has been charged to cost of road and equipment.

The charges to capital account during the year for the improvements was \$780,478, and cost of road and equipment now stands at the balance sheet at \$212,504,714. The principal charges in 1897 were \$303,000 for equipment; \$206,479 for ballasting, and \$185,698 for second track, such additions during the year amounting to 227 miles on the Chicago & Council Bluffs division in Illinois.

At the close of the last year the share capital of the company amounted to \$72,923,161; and consisted of \$26,895,900 of preferred stock, and \$46,027,261 of common stock. It has been increased during the present year by \$2,159,000 of preferred stock, issued in exchange for the same amount of convertible bonds canceled.

The funded debt is now \$137,762,000, a decrease of \$1,399,000 since the last report. The new issues of general mortgage bonds during the year have been \$268,000 for underlying bonds purchased and canceled by sinking funds, \$1,436,000 bonds exchanged for underlying bonds, \$221,000 for underlying bonds maturing July 1, 1897, paid and canceled, and \$759,000 for additions and improvements to the property; total increase \$2,684,000 general mortgage bonds. The bonds retired have amounted to \$4,083,000.

President Miller's concluding remarks on the general situation are as brief as forcible, and we quote them: The Supreme Court has decided that railway associations are a violation of the law against trusts. Therefore all attempts at maintenance of such associations has been abandoned in the territory in which your lines are situated. No great harm is likely to follow, inasmuch as the associations had ceased to be of any special value, and were not likely to be, so long as pooling is prohibited by law. It is to be hoped that in time Congress will see the wisdom of permitting pooling and make it practicable to maintain rates and avoid discrimination.

Illinois Central.—The report of the Illinois Central for the year ending June 30 is just received and is of

somewhat unusual interest, for several reasons. The number of miles worked amounted to 3,130, an increase of 63 miles, or 2.04 per cent. over the preceding year. The gross receipts amounted to \$22,110,937, the increase being about $\frac{1}{2}$ of one per cent. The working expenses increased 5.56 per cent. and the net receipts accordingly declined 8.22 per cent., or in the amount of \$665,000, making them \$7,427,000.

Although the gross receipts increased slightly they decreased 1.52 per cent. per mile of road, making them \$7,064. The net receipts per mile were \$2,373. The earnings, gross and net, per train mile decreased, the gross 5.30 per cent., the net 13.50 per cent.

Such increase as there was in earnings arose from the volume of freight movement. The tons carried increased three per cent. and the ton miles almost 12 per cent., the total ton mileage having reached 2,258 $\frac{1}{2}$ million. The haul increased as did the trainload; that is, the average haul was 227 miles against 209 miles. The average trainload (derived from dividing the ton miles by the freight engine miles) amounted to 194 tons in 1897 and to 182 tons in 1896. Notwithstanding the increased volume of freight, the longer haul and the economies possible through the greater trainload, the earnings were kept down by a diminished rate; that is, in 1896 the average receipts per ton per mile amounted to 0.745 cent., but in the last year they amounted to only 0.671 cent., a decrease of almost 10 per cent. In the rate, which has now come to be one of the very low average rates of the country. The New York Central by its last annual report hauled its freight at an average of 0.67 cent per ton mile, the Lake Shore 0.549 cent, the Erie 0.588 cent and the Pennsylvania Railroad proper (east of Pittsburgh) 0.564 cent per ton-mile. The average ton-mile rate of the Chesapeake & Ohio last year was 0.475 cent.

The earnings from passengers decreased 4.1 per cent. to \$4,214,461. There was a very small increase in the number carried, but the passenger miles decreased 4.1 per cent., and amounted to \$212,985,000. The passenger rate remained precisely the same, namely, 1.979 cents per mile. With the somewhat diminished movement of passengers there was an increase of 7.86 per cent. in passenger engine miles and consequently a decrease of 9.63 per cent. in earnings per passenger train mile; that is, these earnings amounted in 1897 to 77.44 cents; in 1896 they had been 85.69 cents.

The total revenue available after paying fixed charges and rents amounted to \$3,609,462. The sum of \$150,000 was set apart for future betterments and the sum of \$2,625,000 was paid out in dividends at five per cent., leaving \$924,462 carried forward to the surplus dividend fund.

The total operating expenses amounted to \$14,684,000, an increase of 5.56 per cent. over the preceding year. The heaviest increase in the great items was 12.58 per cent. in maintenance of way and structures, which amounted to \$3,594,000. Maintenance of equipment was increased 6.13 per cent., to \$2,713,000. The passenger train expenses and the freight train expenses were increased 7 $\frac{1}{2}$ and 3 $\frac{1}{2}$ per cent. respectively. In maintenance of way and of equipment 28 $\frac{1}{2}$ per cent. of the gross earnings was expended, and the year before the amount expended on these items amounted to a little more than 26 per cent., or say \$5,749,000. During the year two years' supply of rails was purchased at "exceedingly low prices," and over 30,000 tons of new steel was put into track and charged to maintenance.

All of the company's rolling stock, except 10 locomotives, was at the end of the year, on the track fit for service, which is surely an unusual condition of things. Contracts have been made for new locomotives to replace those out of service, and the company is able to handle promptly an increased tonnage.

We get in this report for the first time, so far as we have noticed, some statements of the results of the effort to distribute ownership of the Illinois Central stock among the employees and those resident along the line. It appears that outside the Board of Direction there are now 399 officers and employees owning 1,969 shares of stock of the company, and 1,624 have made partial payments on account of further purchase of one share apiece. Purchases by employees have led to the buying of the stock by other persons living along the line, and at present there are registered on the company's books residents of every state and of almost every county directly served by the road. This condition of things has led to the practice of carrying stockholders to and from Chicago free for stockholders' meetings, a practice which the company inaugurated this year.

In the apparently increasing activity of the populist crusade against corporations, it is gratifying to find a court of wide repute ready to stand as an Ebenezer against the vampire brood that is constantly trying to suck the life blood from corporations merely because they are supposed to have money. If the "Sixth Seal" mentioned in the book of Revelation had been actually opened, the flutter among the lawyers who bring fake actions to win a fake fee would not have raised more dust, and it is entirely safe to assume that in one great jurisdiction, at least, there will be less litigation of this character. The Pennsylvania Supreme Court has handed down a decision in *Baker v. Pennsylvania Railroad* (37 Atl. Rep., 933), that, in effect, "rounds up" the *nisi prius* judges for their shiftless method of sending these damage cases to a jury, when they should throw both the plaintiff and the attorney out of court on a pure question of law. It seems that the decedent, in the case cited, was attempting to cross the tracks at a point

where there was a view both ways of over 200 ft., that the usual warning signals of whistle and bell were given, and that the injured person was an adult with faculties unimpaired. These facts were undisputed. There was a trial before an intelligent jury composed of the "good and true" men of Perry County, and they one and all said that the plaintiff's grief could only be assuaged by the payment of \$5,000. This verdict on appeal was treated with very scant respect, and in a brief and brusque opinion, Judge Dean, in effect, tells the trial court that a jury has nothing to do with *undisputed facts*; that such a situation raises only questions of law, for the court alone to dispose of; and that it is an error, every time, to admit such cases to the consideration of the juries: juries are foreordained to decide against the railroad. Further, it is the duty of the court to grant a motion for a non-suit, and not to go through a process of refined theorizing on which to base a disputed question of fact that can be sent to a jury. His Honor is evidently of the opinion that the commonwealth has spent about all the money it should in the trial of such senseless actions. Certainly the Appellate Court need not have its calendar encumbered by cases that would never be there but for the incompetency or pusillanimity of the Circuit Courts. The Appellate Court often lets the judge down easy by intimating that the case fairly bristled with intricate and novel law points, and that many eminent authorities agreed with his view of the case: But there is no such solace for the Perry County man in this case. He is bluntly reminded that there is a rule, hoary with the frosts of two centuries, that reads: "Disputed facts are for the jury, not undisputed ones."

During the past three weeks the Edison power station at Paterson, N. J., has met with two accidents, bringing the street cars in all parts of the city to a standstill and leaving the city in darkness. The first trouble occurred on a Saturday afternoon, and those who were spending

a part of the day in the suburbs were compelled to get home as best they could. In the evening all those stores that were unable to provide gas or kerosene lights lost their entire Saturday evening trade, which in that city represents a large part of their profits; but it would be difficult to even approximate the amount that was actually lost by this failure. The second failure was on a Sunday evening. For about an hour the city was again in darkness. This time the difficulty was caused by the failure of a feed pump which supplied the water to the boilers. When the reserve pump was called into service it also refused to work, and as no other means were at hand to supply the boilers with water the entire plant was shut down. The company is now putting two new injectors in the plant, but unless they receive more careful inspection than it was common to give the reserve pump we may hear of another breakdown. Unused machinery may last a quarter of a century, but without proper inspection it is very often useless when unexpectedly called into service. In commenting upon these accidents two of the electrical journals have called particular attention to the fact that now the people of Paterson will have a proper appreciation of the value of electricity in everyday life; which is a moderately "cheeky" way of putting the matter. Most of us would say that now the people of Paterson are wondering what trick the electric current will play next. If there is any moral to be drawn, it is that men in charge of such plants ought to realize their responsibility and duty to the public, and, further, that someone in this particular plant ought to be allowed to complete his moral and technical education on some other job.

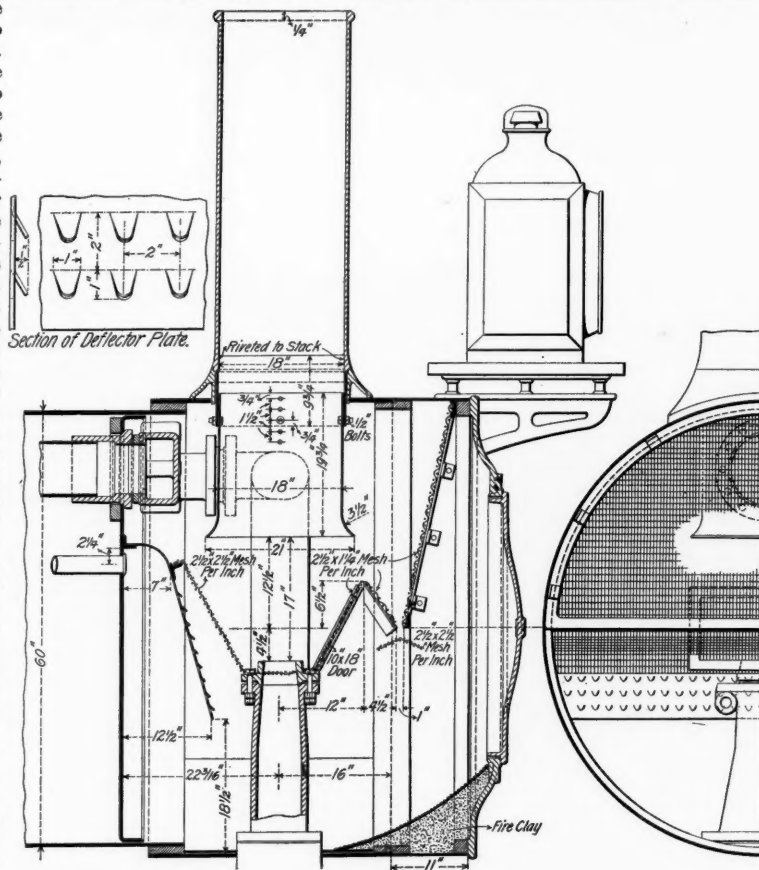
The New York State anti-scalper law has now been on trial about a week, but nothing decisive has happened. On the first day some of the papers said that tickets were being sold by the brokers the same as usual, while others said that not one could be bought. The last statement appears to have been substantially correct, though how long it will remain so we cannot say. The brokers' signs are as prominent and as seductive as ever. At Buffalo a number of brokers' offices were closed, but others were kept open. In New York City a ticket broker's clerk was arrested on the charge of violating the law. The suit is said to be a friendly one. At 125th street and Third avenue, on the same day, two newsboys were arrested, charged with violating the

same law, their offense being the sale of transfer checks which had been given to passengers of the Third Avenue Street Railroad. Magistrate Deuel released the prisoners, holding that the transfer checks were not tickets within the meaning of the law. The anti-scalper law deals only with tickets for passage on vessels and "railway trains," which evidently excludes, under a strict construction, tickets for passage on single street cars; but it does not appear that the court considered this phase of the question. It is clear enough that the street railroads need a law of some kind, if free transfers are to be given, for, according to the reporters, scores of passengers ask for and receive transfer checks for no other purpose than to give them to newsboys, to be subsequently sold for 2 or 3 cents each.

Bell's Spark Arrester on the Baltimore & Ohio.

The Committee on Exhaust Nozzles and Steam Passages, in its report at the 1894 Convention of the Master Mechanics' Association, stated that "an increase in the length of the smokebox over and above that necessary to get in a cinder pocket in front of the cylinder is unnecessary and undesirable, as the long smokebox greatly decreases the vacuum. Sufficient area of netting can be put into a smokebox which is long enough to give room for a cinder pocket in front of the cylinder saddle." The correctness of this proposition does not seem to have been questioned, and it has been followed, with satisfactory results, in many engines recently built, among which may be noted a number of ten-wheelers built for the Mexican Central, and the fast passenger engines for the Illinois Central, by the Brooks Locomotive Works. The utility of the cinder pocket or drop (which is not used in the Mexican Central engines) has been questioned, and in the J. Snowden Bell spark arrester, as applied with short fronts, it is dispensed with.

The latest type of this device, as applied on the Baltimore & Ohio, with improvements in detail by the Ma-



Bell's Spark Arrester as Applied to a B. & O. Locomotive.

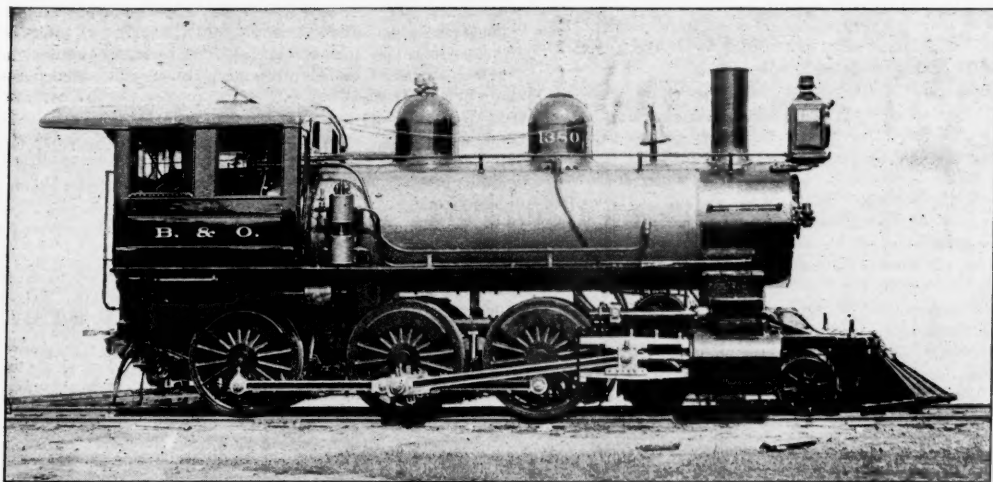
chinery Department of that road, is shown in the accompanying illustrations. The essential features are, as in the earlier applications, two perforated deflecting plates and a series of inclined sheets of netting by which an increased area is obtainable within a given length of smokebox and a more advantageous resistance is presented to the passage of cinders without impairing the steaming of the engine.

In the present form the perforations of the deflecting plate nearest the tube sheet are formed by punching the plate so as to leave inclined portions projecting outwardly from each opening, these portions serving to deflect cinders passing through the openings toward the bottom of the smokebox. Such cinders are prevented from escaping directly to the stack by a sheet of netting, extending, at about the same angle as the main deflecting plate, from the plate to the exhaust pipe. This sheet performs the same function as the front perforated plate of the prior applications, for which it is substituted. A 1-in. opening is left between the bottoms of the two front sheets of netting to prevent liability of filling up, and this is protected by a sheet of netting placed below it. The bottom of the smokebox is filled up in front with fireclay, covered by a roughened plate extending to the smokebox door, and the usual cinder drop is dispensed with, not being found necessary

as there is no accumulation of cinders to any extent in the smokebox.

A comparatively low exhaust nozzle and inward extension of the stack are used, this feature, which is an old

wheels, 60 in. diameter; boiler, 60 in. diameter with 210 flues, 2 1/4 in. diameter; grate area, 32.45 sq. ft.; heating surface, 1,754.31 sq. ft.; weight, 127,500 lbs.; weight on drivers, 101,500 lbs.



Bell's Spark Arrester on Baltimore & Ohio Locomotive.

one, exemplified in foreign practice in 1868 and even earlier, having been found to be desirable, in connection with this or any other arrangement of netting in the smokebox. The stack is cast iron and of the company's standard pattern.

The engine illustrated, No. 1,380, is reported as giving entirely satisfactory results in fast freight service on the Philadelphia Division of the road, her steaming being free, fuel consumption low, and no objection having been found as to throwing fire. The principal dimensions of this engine are: Cylinders, 20 x 24; driving

The arrangement has also been in use for nearly a year in engine No. 1629, one of the large 22 x 28 consolidations built by the Pittsburgh Locomotive Works, in service on the Third Division, which includes the 17-mile grade of 117 ft. to the mile. The performance of the engine in this heavy service has been so good that other engines of the same class are to be equipped with the same arrangement of front. It has also been applied to three 21 x 26 consolidation engines, and to 19 x 24 moguls on other divisions, and will be given a thorough test, under various conditions of service, in order to deter-

mine its practical value as compared with the long extension arrangements, requiring periodical cleaning of fronts, which are used in most of the other engines of the road.

Standard Roadside and Station Signs—Cincinnati, New Orleans & Texas Pacific Railway.

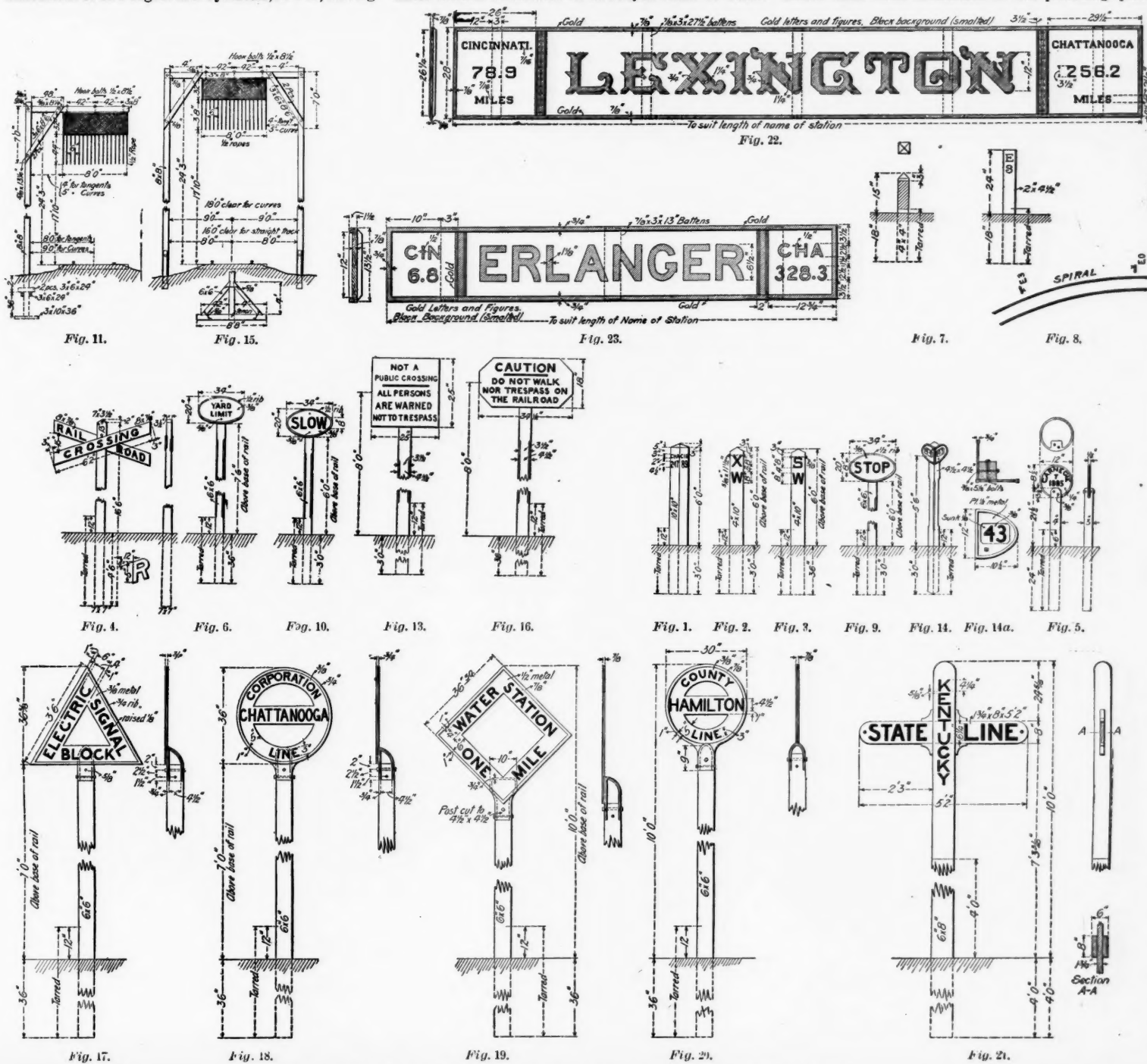
Chief Engineer G. B. Nicholson, of the Cincinnati, New Orleans & Texas Pacific, has lately established standards for track and station signs, drawings of which are shown herewith. From the notes attached to the standard drawings, which were sent to us by Receiver S. M. Felton, we copy certain particulars concerning the design and construction of the signs. The dimensions are shown on the drawings.

The mile post, Fig. 1, is a white post lettered in black. As a rule these posts are set 12 ft. from the center of the track. The whistling post for highway crossings, Fig. 2, is set at the same distance from the track and 1,200 ft. from the crossing. The whistling post for stations, Fig. 3, is set 1,320 ft. from the station, or farther off in case local conditions make it necessary. The whistling posts are to be lengthened if necessary to bring the top 6 ft. above the base of the rail.

The stop post, Fig. 9, for drawbridges, railroad crossings and junctions, has a sign made of cast iron 1/2 in. thick, the letters being raised 1/8 in. The ground of the sign is painted red and the letters white. The casting is bolted to the post with 3/4 in. x 7-in. bolts. The border is painted white. This post is to be set 200 ft. from the crossing or from the end of the draw span.

The section limit post, Fig. 14, carries cast-iron plates with raised edges. The panels are painted white, the figures and face of the plate black and the post and the back of the casting white. These posts are set on the opposite side of the track from the mile posts.

The post described in Fig. 5 is to show the location, make and age of rails. The post and the cast-iron plate are painted black and the letters and figures stenciled in white. The letters and figures are 1 1/2 in. high. This sign is set 10 ft. from the center of the track, 2 ft. nearer than those mentioned in the preceding para-



Standard Roadside and Station Signs—Cincinnati, New Orleans & Texas Pacific Railway.

graphs. The lettering on the face of the sign is to face the rails to which it refers.

The warning sign for highway crossings, Fig. 4, is made of boards $\frac{1}{2}$ in. thick and the letters are 5 in. high. The letters, in black, are painted; the boards are white, and the sign appears on both sides of the board.

The yard limit sign, Fig. 6, is made of cast iron $\frac{3}{4}$ in. thick with a $\frac{1}{2}$ -in. rib for a border. The groundwork of this sign is painted green and the letters white. The letters are $3\frac{3}{4}$ in. high. The post is lengthened if necessary to bring the bottom of the metal plate 7 ft. 6 in. above the base of the rail, as indicated in the drawing.

The slow post, Fig. 10, which is always used in connection with every stop post, has a sign made of cast iron $\frac{1}{2}$ in. thick. The ground of the sign is painted green and the letters white. In other respects the requirements are similar to those of Fig. 6.

The warning sign for private crossings, Fig. 13, is made of boards, as shown. The lettering is black and the ground white. Fig. 16 is made in the same manner. The clearance post, Fig. 7, is painted white, except 3 in. at the top, which is black. The post is to be set at each end of all sidetracks. It is to be at right angles to the tracks and 4 ft. 6 in. from the nearest rail, except when the sidings are less than 14 ft. from the main track. The post shown in Fig. 8, which bears white letters on a black ground, is to be set at the edge of the roadbed to indicate the beginning of curves. Two posts are to be set at each end of the curve, one marked *E O*, at the beginning of the spiral, and one marked with the degree of curve at the point of commencement of the curve. The letters face the tangent.

Figs. 11 and 15 are the warning signs for overhead bridges, Fig. 11 being designed for earth foundation and Fig. 15 for rock foundation. The ropes, 6 in. apart, as shown, depend from a woven wire screen. The meshes of the screen are 1 in. square and it is painted black.

The sign shown in Fig. 17, to indicate the limits of block signal sections, is made of metal $\frac{3}{4}$ in. thick, the letters being raised $\frac{1}{2}$ in. The post and the background of the sign are painted black and the letters and the border of the sign are white. This sign is set 9 ft. from the rail and 150 ft. in advance of each automatic electric block signal.

The town-limit sign, Fig. 18, is made of metal and is the same as the preceding, except as shown in the drawing. In this sign the letters are painted white on a green background, and the post is white. The sign is lettered on only one side.

The signs shown in Figs. 19 and 20 are also made of metal. Both of them have black letters on a white ground. The county-line sign has cast on each side the name of the county toward which it faces. This post is set on the same side of the track as the mile posts. The state-line sign, Fig. 21, is made of boards, as shown. The letters are black and the background white. The post is painted black to a point 4 ft. above the base of the rail.

Fig. 22, showing the station sign for first-class stations, and Fig. 23 showing the same for second-class stations, are self-explanatory. For third-class stations the standard sign is the same as that for second-class, except that plain yellow paint is used in place of gilt, and the background is black, not smalted.

The right-of-way boundary post, Fig. 12, is generally made of an old telegraph pole and is painted white. The letters, in black, are put on with a stencil. These posts are to be set every 500 ft. along the line and oftener in case angles in the line make it necessary.

The following are the numbers of the drawings showing signs which have raised letters, cast in: 6, 9, 10, 14, 17, 18, 19, 20.

TECHNICAL.

Manufacturing and Business.

Mr. Fred A. Knummer, General Representative of the American Wood Preserving Co., of Philadelphia, Pa., has recently secured from the Terminal Railroad Association of St. Louis, an order for a large quantity of woodline to be used on ties and timbers in the Eads bridge. About 60,000 ft. of timber will be treated. A similar use of the material was begun Aug. 3 by the Chesapeake & Ohio in treating ties and timbers for its bridge over the Ohio River at Cincinnati. Several hundred of these of the largest size, for double track, have already been treated and put into place. One of the largest roads running out of St. Louis has recently decided to use the material in treating timber for several large combination bridges and is now arranging a portable treating plant for this purpose.

The Interchangeable Brake Beam Company, of St. Louis, has entered a libel suit in Chicago against the Chicago Railway Equipment Company for damages to the amount of \$100,000. The alleged libels are contained in circulars and letters which have been sent to railroad officers.

The Detroit Steel & Spring Co., Detroit, Mich., will furnish springs for 400 cars now building at the Michigan Peninsular Car Works.

The Shickle, Harrison & Howard Iron Co., of St. Louis, Mo., has received an order from the Kansas City, Pittsburgh & Gulf for equipping 245 new cars with trucks having cast-steel bolsters, 100 cars with Player trucks

and 5 cars with Ajax trucks. The new metal trucks manufactured by the Shickle, Harrison & Howard Iron Co. were described in the *Railroad Gazette* of July 30 last.

The Berlin Iron Bridge Company, East Berlin, Conn., has received a contract to build a new fireproof pipe shop for the Philadelphia Gas Improvement Co., of Philadelphia, Pa. The building will have a steel framework and corrugated iron covering.

Owing to increased business the Pyle-National Electric Headlight Co. is considering moving its factory to Chicago. During the month of August the company reports shipments of electric headlights to the Texas Pacific, Wilmington & Northern, Waco & Northwestern, Houston & Texas Central, Erie & St. Louis Southwestern railroads, and to the Schenectady Locomotive Works for four locomotives now being built for the Texas Midland. An order was also received this month for 26 equipments for the Georgia Southern & Florida.

The National Switch & Signal Co., Easton, Pa., and Chicago, has closed a contract with the Chicago & Northwestern for an interlocking plant at Rochelle, Ill., at the crossing of the Chicago & Northwestern and the Chicago, Burlington & Quincy. The plant will have 11 working levers, and electric locks will be used in connection with the derails.

The Cloud Steel Truck Co., of Chicago, which was organized some time ago, has been incorporated under the laws of Illinois. The capital stock is \$500,000, and the incorporators are Willard A. Smith, Charles L. Sullivan and E. W. Rosenberg.

The Franklin Construction Co. has been incorporated in New Jersey to deal in railroad equipments and build railroads in Maine. The incorporators are: Leonard Apwood, William Ambler, Arthur J. Ambler, W. E. Boughton, of Philadelphia, Pa., and William D. Hewitt, of Burlington, N. J. The capital stock is \$50,000. The offices of the company will be at Camden, N. J.

William C. Lane and Flavell McGhee have been appointed Receivers for the United States Car Co. in Illinois, Ohio, Alabama and New Jersey, and the former Receiver for the property of the company in New York State. J. M. Maris, General Manager of the company, has been appointed agent for the Receivers. The suit which has brought about the receivership is a friendly one, and a new company is now being organized that will probably be incorporated under the laws of the state of Illinois to take over all the property and business of the old company. The company was originally organized with a capital of \$3,500,000, and owned property at Hegewisch, Ill., Anniston and Decatur, Ala., and Urbana, O. The assets are estimated to be \$1,124,570.

The Foundry Investment Co., St. Louis, has been formed to take over the property of the Ranken & Fritsch Foundry & Machine Co., at St. Louis, which was recently bought at a foreclosure sale for \$40,000 by the bondholders. The capital of the new company is \$40,000.

The shops of the United States Car Co., at Anniston, Ala., which have been idle for some time, have resumed work. This is owing to an order for 500 cars received from the Louisville & Nashville Railroad, as noted in another column.

About one third of the men of the lap mill of the National Tube Works at McKeesport, Pa., went on a strike last week, owing to the refusal of the company to restore the spell hands, given them in times of hot weather.

The Pittsburgh Testing Laboratory, Ltd., Pittsburgh, has been commissioned by Major B. M. Harrod, Chief Engineer, to inspect the machinery and steel used in connection with the work of the Drainage Commission of New Orleans, La. This includes the inspection of the compound condensing engines and the centrifugal and screw pumps to be built by the E. P. Allis Co., Milwaukee, the Babcock & Wilcox boilers, the generators and motors to be furnished by the General Electric Co., and 1,500 tons of rolled steel at the Homestead Works of the Carnegie Steel Co., Ltd. The Pittsburgh Testing Laboratory also inspected the steel and machinery used at the Controlling Works of the Chicago Drainage Canal near Lockport.

Iron and Steel.

Extensive repairs will be made to No. 1 blooming mill of the Pennsylvania Steel Co., during which time No. 2 mill will be taken off specials to supply the blooms for the rolling mill, which will be kept running. Work of repairing No. 3 furnace has been finished.

The Carnegie Steel Co., Ltd., Pittsburgh, Pa., has placed an order with the Newton Machine Tool Works, of Philadelphia, Pa., for four rail-end machines and one cold saw. They will be placed in the Homestead works.

The Export Iron & Steel Co., of Pittsburgh, Pa., has been formed by A. R. Whitney, of Morristown, N. J.; Charles A. Painter and James H. McCutcheon, Allegheny, Pa.; Frank L. Clark, of Sewickley, Pa.; Myron C. Wick, of Youngstown, O., to deal in iron and steel products. The capital stock is \$220,000.

The La Belle Iron Works, of Wheeling, W. Va., has placed an order with the Leechburg Foundry & Machine Co., of Pittsburgh, Pa., for one No. 2 Mestca patent pickling machine, six 36-in. doubling shears and 36-in., 42-in. and 48-in. squaring shears, for use in tin-plate plant now being built.

Arrangements have been made to reopen the rolling mill, machine shop and foundry of the Mahoning Roll-

ing Mill at Danville, Pa., which have been idle for some time.

Mitchell, Tranter & Co., of Cincinnati, O., has placed an order with Hyde Bros. & Co., Lewis Block, Pittsburgh, Pa., for a 300-H. P. boiler to be built in connection with their heating furnaces at Covington, Ky.

The Union Tube & Iron Co., of Niles, O., has been incorporated with a capital of \$50,000, to make and deal in iron and steel, metal pipes and tubes. The incorporators are: C. D. Hine, W. DeP. Knowlton, D. F. Garrison, Warner Arms and F. P. Peet.

The Milwaukee Steel Casting Co., of Milwaukee, Wis., has been organized to make castings of wrought iron, open hearth steel, crucible steel, Mitis metal and special tool steel. The officers are President, L. V. Shaw; Vice-President, O. P. Watson; Secretary and Treasurer, C. N. Bowen.

The Andrews Brothers Co., operating Haselton Furnace, at Haselton, O., has placed an order with Julian Kennedy, of Pittsburgh, for an additional 18 x 80 ft. Kennedy-Cowper hot-blast stove.

The Buhl Steel Mill at Sharon, Pa., was forced to stop work Sept. 7 owing to a strike of the gas makers, whose demand for an increase from 12½ to 15 cents an hour was refused.

The Tennessee Coal, Iron & Railroad Co. last week sold 63,290 tons of iron and advanced the price 25 cents a ton on Sept. 8, making a total advance within the last 10 days of 75 cents a ton.

The Duquesne Tube Co., McKeesport, Pa., which met with financial reverses some months ago, has been reorganized and will soon resume work. The following new Board of Directors has been elected: W. A. Dunshee, James M. Bailey, H. B. Shields, E. N. Ehn and D. Leet Wilson. The capital stock has been increased from \$150,000 to \$350,000.

The Scherzer Rolling Lift Bridge Co. has been formed to make all kinds of movable bridges, but more especially the Scherzer rolling lift bridge, now well known to our readers. Albert H. Scherzer, whose business has been absorbed by the new company, is President, with offices in the Unity Building, Chicago. The rocking bascule bridge of the Scherzer type, built over the south branch of the Chicago River at Van Buren street, Chicago, was fully described in the *Railroad Gazette* Feb. 15 and 22, 1895.

The Pacific Car Co., of Portland, Or., has been incorporated under the laws of Oregon to make and sell couplers. The capital stock is \$400,000, and the incorporators are John J. Malloy, R. W. Baxton and E. Lyons.

The expected change in the controlling interests of the Gibbs Electric Co., of Milwaukee, Wis., has been made. It has been formally announced that the Westinghouse Electric and Mfg. Co., of Pittsburgh, Pa., has bought out the interest of the Gibbs Electric Co. The consideration is said to be \$50,000.

New Stations and Shops.

The Eastern Railroad of Minnesota has just completed a new distributing freight yard at West Superior, Wis. It has 11 tracks, with an average length of 2,368 ft.

The contract for building a steel truss-shed for the new station of the Cleveland Terminal & Valley Railroad at Cleveland, O., has been awarded to the Massillon Bridge Co., of Massillon, O. It will cost about \$32,000.

The contract for building the new station for the Butte, Anaconda & Pacific Railroad at Anaconda, Mont., has been awarded to Dolan & Hammill, of that city. The new building will be about a block east of the present station.

The new freight station of the Chicago, Indianapolis & Louisville, on Fourteenth street, Louisville, Ky., was finished Sept. 1. The new station is of the same dimensions as the old one and will be used for outbound and the latter for inbound freight.

Breitweiser & Co., of Pittsburgh, Pa., have been awarded the contract for building a new station for the Pittsburgh & Lake Erie Railroad, at Beaver, Pa. Work has already begun.

The new station of the Chicago & Northwestern, at Belvidere, Ill., was formally opened Aug. 31. It is built of vitrified brick and terra-cotta trimmed with Bedford stone. The station proper is 96 x 24 ft., with two trainsheds, each 30 x 24 ft. The interior is finished in Georgia pine.

The Gould Railroad Pumps Driven by Electric Motors and by Gas Engines.

An advance circular issued by the Gould Manufacturing Co., of 16 Murray street, New York, contains some interesting information relating to the use of gas engines and electric motors for driving pumps to supply locomotive tanks, in pumping stations, and for other purposes where a large supply of water is required. At Itasca, Ill., a Gould triplex, double acting power pump is driven by a 75-H. P. motor, which is in turn driven by an alternating current generator a mile and a quarter distant. The pump is used to supply water to put out fires in the freight-house, which is 300 ft. wide and 1,500 ft. long and contains five fire stations, each fitted with firealarm apparatus connecting with the power-house at the shops, switch for starting pump and motor, and reels for hose, so that upon discovering a fire one man can get water to it in less than 30 seconds. A description of the Itasca plant, to

gether with an engraving of the Gould pump, was published in our issue of Dec. 25, of last year. This circular also describes one of the plants where the pump is being driven by a gas engine connected directly with it by a belt. The plant has been in successful daily operation from the first of this year, the Pennsylvania Railroad having built a small pump-house at Sharon, Pa., on the Chenango River, last December. The pump is one of the regular Gould triplex power pumps for tank service, the plungers being 8-in. diameter by 10-in. stroke. Water is taken from the river through 75 ft. of 6-in. pipe at an elevation of 12 ft. in the ordinary stages of the river, and delivered through about 100 ft. of 5-in. pipe to the tank, the elevation above pump being 33 ft. The pump runs at the moderate speed of 32 revolutions per minute of the crank shaft, delivering 12,480 gals. each hour. The gas engine, built by the New Castle Gas Engine Co., New Castle, Pa., drives the pump by means of belt, the pump being fitted with tight and loose pulleys. Natural gas is used for power, costing 22½ cents net per 1,000 cu. ft. Formerly water was bought of the local water company at eight cents per 1,000 gals., but the cost at this station has been greatly reduced, as will appear from the following figures: For last March the gas, oil and waste cost \$1.92. The total amount of water pumped during the month, 867,360 gals., about 28,000 gals. daily. Total cost per 1,000 gals. pumped, 2.2 mills. There are no charges for labor, because the station baggage-master starts and stops the pump and engine, the work of only a few minutes daily. The capacity of this pump considerably exceeds the requirements, about two hours pumping each day supplying all the water needed for the present light amount of business. However, the large capacity and slow speed are good features, because expense of repairs is practically eliminated for a long term of years.

Improvements at Mobile, Ala.

The Mobile & Birmingham Railroad is extending its docks and storage facilities at Mobile to meet a growing trade. The plans now being carried out provide for a new slip 360 ft. long and 110 ft. wide, which is being dredged to 23 ft. to the main river channel. On either side of this dock tracks will be laid parallel to the outer ends of the piers. Substantial sheds 50 x 216 ft. will be built on either side, and parallel with the dock, on pier foundations. The north side will be arranged for a storage house for incoming and outgoing cargoes. The south pier, on which the open sheds will rest, is 70 x 346 ft. The work will cost about \$30,000.

Power Development of the Big Hole River.

The project for the development of water power to be transmitted by electricity from Big Hole River to Butte, Mont., is being actively carried out. The dam to be built will give a head of 60 ft., developing about 6,000 H. P. at the average flow of water. An auxiliary steam plant is proposed. Work has been begun on the plant by Williams, Poasans & Bonner, of Butte. The Consulting Engineer is J. T. Fanning, and the engineer in charge of construction is M. S. Parker.

Bids for Heavy Projectiles.

Bids for furnishing heavy projectiles for the Ordnance Department of the army were opened Sept. 2. The bidders were the Driggs-Seabury Gun & Ammunition Co., New York; the Midvale Steel Co., Philadelphia; the Firth-Sterling Steel Co., New York, and the Carpenter Steel Co., New York. On all five items on which bids were asked the Driggs-Seabury Co. was the lowest bidder. It agreed to furnish 195 8 in. shot at \$69.80 each; 605 10-in. shot at \$114.50 each; 150 12-in. shot at \$212 each; 270 12-in. mortar shells of 800 lbs. weight at \$114 each, and 50 12-in. mortar shells of 1,000 lbs. weight at \$195 each.

New Steamer for the Merchants' & Miners'.

The steamship Juniata, built for the Merchants' & Miners' Transportation Co., of Baltimore, Md., by the Harlan & Hollingsworth Co., of Wilmington, Del., was launched Sept. 2 in the presence of several thousand spectators. The new vessel is full four deck, 270 ft. long on the water line, 52 ft. moulded beam and 34 ft. depth of hold. The hull is of iron and is similar in design to that of the Howard, built for the same company by the Harlan & Hollingsworth Co., in 1895. The engine is of the direct acting triple compound type, with inverted cylinders. The high-pressure cylinder is 23 in., the intermediate cylinder, 45 in., and the low-pressure cylinder 72 in. in diameter, with 48-in. stroke. Steam will be supplied by four Scotch boilers, each 13 ft. 6 in. in diameter and 11 ft. 6 in. long. They will have a working pressure of 160 lbs. The propeller is four-bladed, of manganese bronze and 16 ft. in diameter. It is expected that a speed of 15 knots an hour will be obtained with a draught of 18 ft. The vessel was built in a very short time, the first frame having been set up April 20. The Juniata will be ready for service about Nov. 1 and will replace the Essex on the Boston line.

THE SCRAP HEAP.

Notes.

The Plant System has just completed a new hospital building at Montgomery, Ala.

On the night of Sept. 3 a train of the Union Pacific, Denver & Gulf was stopped by robbers near Folsom, Colo., and the safe in the express car was blown open and rifled.

On Sept. 1 the roundhouse of the Kansas City, Fort Scott & Memphis at Springfield, Mo., was destroyed by a

fire which started from the explosion of a gasoline engine. Loss \$55,000.

The Trainmaster of the Cincinnati division of the Chesapeake & Ohio states that during the year 1896 not a single vacancy occurred in the ranks of the brakemen on that division.

At the Farmers' National Congress, held in St. Paul last week, a resolution favoring government ownership of railroads was overwhelmingly defeated, receiving only five or six affirmative votes.

The Baltimore & Ohio Southwestern has lately been making excellent time with its fast freight trains. Two runs between Cincinnati and Parkersburg, 200 miles, were made in 8 hours 4 minutes each. A run from St. Louis to Cincinnati, 340 miles, was made in 16 hours.

Mr. T. W. Pate, Agent of the Atchison, Topeka & Santa Fe at Streator, Ill., has received from the railroad company a prize of \$200, which was offered to the agent showing the largest proportionate increase in business during the first six months of 1897. The second prize of \$150 went to E. H. Barnett, of Brenham, Tex. and the third, \$100, to H. A. Miller, El Dorado, Kan.

B. & O. Improvements.

Before the new freight engines of the Baltimore & Ohio were purchased and the improvements made in the track in the way of straightening curves and reducing grades, the average number of cars to the train was 28½. Now the average is 40 car train, an increase of 41 per cent. The average eastbound movement per day for the first 10 days of August was 1,123 loaded cars. On the Third Division, Cumberland to Grafton, where there are grades of 125 ft. to the mile, the engines used to haul 19½ loads to the train. Now the average is 25½ loads per train, an increase of 31 per cent.

Passengers' Hand Baggage in Europe.

The experiment of the introduction of cheap cab service by railroad companies at terminal stations is an interesting one. They are already in use at the Twenty-third Street, New York, terminus of the Pennsylvania Railroad, and the daily papers state that movements are on foot for their introduction at the Grand Central Station by the New York Central, and also by the Erie. Cheaper cab service, if maintained in this country for a sufficient length of time, would probably become popular. One feature of European cab service, and an important one, consists in the facility with which a passenger can carry his baggage along with him. This feature of the cheap cab service in London and Paris is undoubtedly found convenient by travelers, but the conditions surrounding the handling of baggage there are quite different from those existing in this country. Generally speaking, there is a baggage compartment in each car, which carries the baggage belonging to the occupants of that car. Numerous porters are waiting on the platform ready to handle trunks and other baggage the moment the train arrives. Owing to the fact that the baggage is distributed along the length of the train instead of being concentrated in one or two cars, as in this country, it is possible to employ a greater number of men to handle it, and consequently it can be moved much more quickly. Again, the number of trunks in proportion to the number of passengers is much less than in this country. From five to ten times as much rack room is provided for hand baggage, and the racks are generally well filled. The European tourist takes along with him in his compartment a quantity of hand baggage which is simply amazing to one familiar only with traveling in America. This custom is largely due to the fact that only a very small quantity of heavy baggage is carried free. The system of booking heavy baggage, while not dissimilar in its results to the checking system in this country, is a much longer and more vexatious process. No charge is made for hand baggage unless excessive in amount. It is not considered excessive when far more than a traveler here would think of carrying otherwise than in a trunk. "Carryalls" and all sorts of coverings for hand baggage are offered for sale to travelers in Europe, and no one is well equipped for a journey there unless he is provided with a full supply. The unloading of this hand baggage through the side doors of a compartment causes no delay at a way station, and can be quickly accomplished at a terminal. An equal amount distributed through our American corridor cars, with end doors, would produce blockades and delays very frequently. In fact it would be impossible to provide sufficient rack area.—*Travelers' Official Guide.*

August Traffic Through the Soo Canal.

The official report of freight and passenger traffic to and from Lake Superior for the month of August is received, covering statistics of the United States and Canadian canals. The total eastbound freight in net tons amounted to 2,674,000; the westbound was 259,000. The total registered tonnage through the United States Canal amounted to 2,219,000 and through the Canadian Canal 707,000. The total craft through the United States Canal were 2,017 and through the Canadian Canal 813. The grain through the two canals amounted to 2,182,000 bu., the flour to 1,068,000 bbls. and the wheat to 2,959,000 bu. The iron ore carried was 2,171,000 net tons.

Railroad Assessments in Arkansas.

The Arkansas State Board of Railroad Assessors have finished their work for the present year. The length of railroad built since last year's assessment is 137 miles. The total valuation is \$22,182,259, an increase over 1896 of \$1,069,881.

Water Supply on the Santa Fe Pacific.

The dams which the Atchison, Topeka & Santa Fe is constructing on the Santa Fe Pacific road are situated at Walnut, Ash Fork and Seligman, Ariz. They are in each case across canons and when completed it is expected that each will store a two years' supply of water. The dams at Walnut and Seligman are being made of masonry and that at Ash Fork of steel. The total estimated cost of the three dams with the necessary piping is \$225,000. The dam at Seligman is partially completed and now holds a considerable quantity of water, so much that the company has discontinued hauling water to that point. The annual expense for water supply on this road has been about \$75,000, a large percentage of which will be saved when these dams are completed.

To Build Railroads in Ecuador.

The Guayaquil & Quito Railroad Company has been incorporated in New Jersey with a capital of \$12,282,000 to build and operate railroads in Ecuador, S. A., under grants made to Archer Harmon, of Louisville, Ky., Peter Cooper Hewitt, of New York, and T. H. Powers Farr, of Orange, N. J. The incorporators are: Peter Cooper

Hewitt, George Hoadly, Nelson B. Burr, Charles H. Lee, E. Hope Norton and John C. Kilbreth, of New York; Archer Harmon, Louisville; Robert M. Thompson and T. H. Powers Farr, Orange, and Peter F. Dumont, of Paris, France.

A Few August Earnings.

The gross earnings of a number of roads for August compared with the corresponding month of 1896 were reported as follows:

	1897.	Inc. or Dec.
Alabama Great Southern	\$135,038	I. \$12,598
C., C. & St. Louis	1,218,262	I. 127,392
Central of Georgia	380,348	D. 2,393
Chesapeake & Ohio	1,063,109	I. 140,830
Chicago, Ind. & Louisville	296,978	I. 37,838
Chicago Great Western	487,830	I. 70,554
Cleve., Lorain & Wheeling	102,130	D. 3,925
Georgia & Alabama	79,475	D. 280
Elgin, Joliet & Eastern	97,768	D. 16,366
Great Northern	1,777,585	I. 67,288
Kanawha & Michigan	44,493	I. 9,351
Louisville & Nashville	1,770,940	I. 120,153
Louis., Evansville & St. L.	131,038	D. 14,036
Louis., Henderson & St. L.	51,071	I. 4,754
Mexican National	467,378	I. 70,683
Mexican Central	986,767	I. 160,769
Missouri, Kansas & Texas	987,769	I. 4,240
Mobile & Ohio	311,805	I. 32,668
Norfolk & Western	950,174	I. 145,802
Ohio River	85,508	I. 298
St. Louis Southwestern	373,400	I. 29,500
Southern Railway	1,565,073	I. 123,071

New Lake Vessels.

Chicago papers report that work was begun last week on the new steel steamer for C. W. Elpicke and others by the Chicago Shipbuilding Co., contract for which was closed some days ago. This steamer will be 400 ft. long, width of beam 48 ft., and depth 28 ft. The engines are to be quadruple expansion.

Cleveland dispatches report that the Cleveland Shipbuilding Co. will soon lay the keel of a boat to be the largest on the lakes. Its dimensions will be—length over all, 450 ft.; depth, 28½ ft.; length of keel, 430 ft.; beam, 50 ft., and it will be capable of carrying 7,000 tons of cargo. The name of the owner is not given. The longest boat in service now is the Rockefeller steamer Fairbairn, which has an over-all length of 434 ft. As the limit of beam for freighters has been 48 ft. and of depth 28 ft., the new boat will be noticeably larger.

The Globe Iron Works have a contract for a steel barge, to be 378 ft. long and 45 ft. beam, to be built for Mrs. Margaret A. Mack, William H. Becker and William A. Mack.

LOCOMOTIVE BUILDING.

The Baldwin Locomotive Works are building an engine for the Mobile & Birmingham.

The Pittsburgh Locomotive Works are building one engine for the South Atlantic & Ohio Railroad.

The Baldwin Locomotive Works has received an order for seven 10-wheel locomotives for the Houston, East & West Texas Ry. They will have 18 x 24 in. cylinders, 56-in. driving wheels, and weigh 90,000 lbs., on the drivers, with a total weight of 120,000 lbs. They are to be fitted with Westinghouse-American air-brakes.

The Schenectady Locomotive Works, Schenectady, N. Y., is building two eight-wheel passenger and two 10-wheel freight engines for the Texas Midland. The former will have 19 x 24 in. cylinders, 69-in. drivers and weigh in working order 120,000 lbs. The boiler will be of the extended wagon top type, radial stayed, with boggan firebox, and capable of carrying a working pressure of 180 lbs. The tenders will have a capacity of 4,000 gals. The freight engines will have 19 x 24 in. cylinders 53-in. drivers and weigh in working order 132,000 lbs. In other respects the specifications will be as for the passenger locomotives. Westinghouse air-brakes, Westinghouse air signals, steam bell ringers, magnesia sectional boiler lagging, Pyle-National electric headlights, Houston sanding apparatus, 2½ in. Consolidated safety valves and the Consolidated steam heating system will be used on the locomotives. They will have cast-steel driving boxes and the driving wheels will be of cast steel. Standard steel tired wheels will be on both engines and tenders.

CAR BUILDING.

The Southern Pacific is reported in the market for 10 passenger cars.

The St. Charles Car Co., of St. Charles, Mo., is building 200 freight cars for the St. Louis Southwestern.

The report that the St. Louis, Vandalia & Terre Haute is in the market for 500 cars is denied by the Receiver of the road.

The Buffalo, Rochester & Pittsburgh has placed an additional order with the Buffalo Car Mfg. Co. for 100 freight cars.

The Illinois Central will order two café cars in the near future. It is expected the order will go to the Pullman Company.

The Chesapeake & Ohio and Cleveland, Cincinnati, Chicago & St. Louis have each ordered of Pullman's Palace Car Co. 1,000 box cars.

The Louisville & Nashville road has ordered 500 box cars from the United States Car Co. These cars are being built at the car company's shops at Anniston, Ala., and will have Westinghouse air brakes, Wagner car doors, Winslow roofs, wooden brake beams, L. & N. standard cast journal boxes and the railroad company's standard couplers.

The Pullman Company has received an order from the Florida East Coast Railway for four parlor cars, and from the Western Railway of Alabama for one mail car. The report published by a contemporary that the Pullman Company is building 12 new sleeping cars for the Santa Fe service is denied by the car company. Some sleeping cars used by this road are undergoing repairs.

BRIDGE BUILDING.

Bridgeport, Conn.—The Common Council has adopted the plans of City Surveyor Scofield for a draw-bridge to replace the Yellow Mill structure. Bids, it is said, will probably be asked soon. Estimated cost about \$70,000.

Burks Falls, Ont.—The Ontario government will

build an iron bridge across the Magnetawan River at this place. Further particulars may be obtained from E. Bazett, County Clerk.

Easton, Pa.—The County Commissioners have given the Standard Construction Co., of this city, the contract for widening the bridge over Jacobus Creek, at Portland. Their bid was \$1,000.

Garfield, N. J.—A joint committee of the Passaic and Bergen Counties Boards of Freeholders has recommended that a new bridge, to cost about \$20,000, be built to replace the present Garfield bridge.

Harrisburg, Pa.—An ordinance has been presented in Common Council providing for a foot bridge over the Pennsylvania and Reading railroads at Market street.

Kenduskeag, Me.—The town has voted to build a steel bridge to replace the one recently burned at Higninsville.

Ludlow, Mass.—The supervisors have awarded the contract for the new bridge which is to replace the Putts structure to the Pittsburgh Bridge Co. at \$14,699. The 13 other bids received range from \$16,000 to \$21,833.

Pittsburgh, Pa.—The Mayor has signed the ordinances awarding the contracts for three bridges over the Pennsylvania Railroad at the East End.

Roanoke, Va.—It is said that bids will be received Sept. 27 for a steel bridge over Tinker Creek at Richmond Ford. It will have a span of 110 ft. and a roadway 16 ft. wide and will be built on stone abutments. J. H. Wingate, City Engineer, has plans.

Stillwell, Ind.—It is said that the Peoria & Eastern will build a new steel bridge at this place.

Thornbury, Ont.—The Town Council has resolved to build several new bridges.

Toms River, N. J.—The Ocean County Board of Freeholders has voted to build a new iron bridge across Toms River at the foot of Main street to replace the one now there.

Towanda, Pa.—The Grand Jury has recommended a new bridge over Shepards Creek, in Sayre Borough, to take the place of the one that collapsed a few weeks ago.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & Eastern Illinois, quarterly, preferred, 1½ per cent., payable Oct. 1.

Concord & Montreal, quarterly, all classes, 1½ per cent., payable Oct. 1.

Northern, of New Hampshire, quarterly, 1½ per cent., payable Oct. 1.

Oregon Railway & Navigation, quarterly, preferred, 1 per cent., payable Oct. 1.

Portland & Rumford Falls, quarterly, 1 per cent., payable Sept. 15.

West Jersey & Seashore, common, 2½ per cent., payable Sept. 15.

Buffalo Railway, quarterly, 1 per cent., payable Sept. 15.

Chicago City, quarterly, 3 per cent., payable Sept. 30.

North Shore Traction, preferred, 3 per cent., payable Oct. 1.

West End Street (Boston), common, 4 per cent., payable Oct. 1.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Alabama Great Southern, annual, for election of directors and other business, Birmingham, Ala., Oct. 6.

Chesapeake & Ohio, annual, for election of directors and other business, Richmond, Va., Oct. 19.

Louisville & Nashville, annual, Louisville, Ky., Oct. 6.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *American Society of Railroad Superintendents* will hold its next meeting at Nashville, Tenn., beginning Sept. 22.

The *American Street Railway Association* will hold its sixteenth annual convention in Convention Hall, Niagara Falls, Oct. 19-22, 1897.

The *Association of Engineers of Virginia* holds its formal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 2 p. m.

The *Association of Railway Superintendents of Bridges and Buildings* will hold its seventh annual convention at the Brown Palace Hotel, Denver, Col., beginning Oct. 19, 1897.

American Institute Fair.

The American Institute Fair, New York City, will open Sept. 20 and close Nov. 4. The general nature of the exhibits which are held each year at Madison Square Garden are probably too well known to require special mention. The established custom of giving awards will be followed as usual. Applications for space may be made to Alfred Chasseaud, 111 West Thirty-eighth street, New York City.

Pennsylvania Street Railway Association.

The sixth annual convention of the Pennsylvania Street Railway Association was held on Sept. 1 and 2, at Allentown, Pa. In the absence of the President, Mr. John Lloyd and Mr. Robert E. Wright presided. After the address of welcome papers were read as follows: "Street Railway Legislation," by Dallas Sanders, of Philadelphia; "Relation Between Claim and Operating Departments," by Mr. Day, of Wilkes-Barre; "Trolley Service in the Future," by Mr. R. N. Douglass, of Norristown.

Central Railway Club.

A regular meeting of this club will be held at the Hotel Iroquois, Buffalo, N. Y., Sept. 10. The reports that are to be read are "Memorial to the late W. H. Gurney," Committee, E. A. Miller, Eugene Chamberlin, F. B. Griffith. "Steel Shapes for Trucks; Best Method, Rolled or Pressed," Committee, H. H. Hewitt, James B. Brady, C. T. Schoen, John W. Cloud. "Journal Bearing Keys: Their Proper Relation to the Journal Bearings and Box," Committee, H. F. Ball. "The Use of Malleable Iron in Car Construction and Repairs." (Non-debatable paper) Eugene Chamberlin. The discussion will be upon "Brick Arches in Locomotive Fire-

boxes." Committee, F. B. Griffith, George Hazleton, E. P. Mooney, A. E. Mitchell, George W. West. It is desired that members should interest themselves in this feature of the docket, in order that it may be strengthened, and made instructive, beneficial and attractive. They are earnestly requested to prepare queries of general interest and importance in advance, bring them to the meetings, and be prepared by knowledge and experience to debate the various points that may be raised.

St. Louis Railway Club.

The next regular meeting of the St. Louis Railway Club will be held at Washington University, St. Louis, Sept. 10 at 3 p. m. A paper will be presented by J. A. Gohen, Master Painter C. C. & St. L. Ry., Indianapolis, Ind., entitled, "Care and Sanitation of Railway Passenger Equipment at Terminals."

The October meeting will be held in the parlors of the Southern Hotel, St. Louis, on Oct. 8, at 3 p. m. At this meeting a paper will be read by Frank Reardon, Superintendent Motive Power Missouri Pacific, the title of which will be announced later. In addition to the afternoon meeting a meeting will be held in the Exposition Building on the same evening, Oct. 8. This evening will be known and advertised as "St. Louis Railway Club Night." An address will be made by Capt. W. W. Peabody, Vice-President and General Manager of the Baltimore & Ohio Southwestern.

The November meeting will be held on Nov. 12 at 3 p. m., at Jefferson Barracks, St. Louis. Through the courtesy of the Missouri Pacific, a special train has been placed at the disposal of the Club. Arrangements are being made for papers and also for an inspection of the barracks, in which are stationed six troops of U. S. Cavalry.

Western Society of Engineers.

A regular meeting of the Western Society of Engineers was held in the Society rooms, Monadnock Block, Chicago, Wednesday evening, Sept. 8. H. M. Brinkerhoff, B. J. Arnold and L. L. Summers, constituting the Electrical Committee of the Society, presented information regarding moto-cycles, which they have been collecting for some time past. This information has been furnished by American and foreign engineers and manufacturers, among which the following can be mentioned: Société des Ingenieurs Civils de France; R. Varennes, C. E., Paris; Felix Millet, C. E., Paris; Société Anonyme des Automobiles Peugeot, Paris; Panhard & Levassor, Paris; W. W. Beaumont, London; Sir David Solomons, London; Duryea Motor Wagon Co., Springfield, Mass; Morris & Salom, Philadelphia, Pa., etc.

The Entertainment Committee made a final report on the contemplated excursion to Niagara Falls and Philadelphia. It is expected that a sufficient number of members will be able to go with the excursion party to insure its success. The route laid out is as follows: Leave Chicago, via the Grand Trunk, afternoon of Wednesday, Sept. 22. Attend the opening of the new steel arch bridge of the Grand Trunk at Niagara and inspect the electric power plant on Sept. 23. Inspect the manufacture of American Portland cement in the Lehigh Valley on Sept. 24, reaching Philadelphia the same evening. Inspect the manufacture of concrete stone and brick (for New York Central Depot, New York), near Philadelphia, on Sept. 25. Other inspection of things of engineering interest will be made on the 24th and 25th, visits to the Bethlehem Iron Works and Cramp's shipyard being the probable events. The return trip will be commenced early Sunday morning, via Lehigh Valley and Grand Trunk, so as to reach at Chicago early Monday morning, Sept. 27. Tickets for the entire trip, covering the cost of one double berth in sleeper for each night, transportation and all meals, will not exceed \$20. Enough sleeping cars to accommodate the party will be chartered and may be occupied night and day during the trip. The committee will make all assignments in cars and arrange for meals.

PERSONAL.

—Mr. M. B. Cutter, Superintendent of the Pittsburgh Division of the Baltimore & Ohio, headquarters at Pittsburgh, Pa., resigned that office Sept. 1.

—The announcement that Mr. A. H. Thorp, Assistant to the General Manager of the Ohio River, has resigned to accept the position of Auditor of the Long Island, is authoritatively denied.

—Mr. John S. Chambers, Master Mechanic of the Illinois Central, with headquarters at Paducah, Ky., has resigned, to take effect Sept. 15. Mr. Chambers has been connected with the Illinois Central for about 5 years.

—Mr. D. B. Morey, Secretary of the New Orleans & Western, with headquarters at New Orleans, La., has resigned. Previous to his connection with the New Orleans & Western, Mr. Morey was General Freight Agent of the Southern lines of the Illinois Central.

—Mr. C. F. Quincy, of the Q & C Co., Chicago, has been elected one of the directors of the Iowa Central and also has been appointed Honorary Commissioner, for the state of Illinois, to the Trans-Mississippi and International Exposition to be held at Omaha, Neb., in 1898.

—Mr. J. A. Naugle, heretofore Assistant General Manager of the Sonora Railway and the New Mexico & Arizona Railroad, has been appointed General Manager of the former company. Mr. Naugle will retain his office of General Freight and Passenger Agent of both roads.

—Mr. A. L. Mohler, heretofore Vice-President of the Oregon Railroad & Navigation Co., has been elected President of that company, to succeed Mr. E. McNeill. Mr. Mohler was elected Vice-President of the company last May, coming from the Minneapolis & St. Louis, of which company he was appointed General Manager on July 21, 1894.

—Mr. J. F. Duntley, President of the Chicago Pneumatic Tool Co. and Mr. Joseph Boyer, arrived Tuesday of this week on the steamer New York, after a very successful trip in England and on the continent. Mr. Duntley went abroad about three months ago and has traveled through every country in Europe, introducing the Boyer pneumatic tools, and Mr. Boyer joined him two months later.

—Mr. Benjamin Brewster, First Vice-President of the Chicago, Rock Island & Pacific, died suddenly at his summer home in Cazenovia, N. Y., Sept. 4, of apoplexy. Mr. Brewster was born in Norwich, Conn., June 30, 1828. In 1849 he went to California, where he remained in active business for 25 years. Since his return to the East in 1874, Mr. Brewster has been identified in the building of the elevated railroads in New York City

and also in the construction of the Chicago, Rock Island & Pacific and the Chicago, St. Paul, Minneapolis & Omaha.

—Sir Charles Scotter, who now retires from office as General Manager of the London & South Western Railway, has become known personally to a good many Americans and indirectly to very many more who have in recent years gone to England by the way of Southampton. He is a man of great energy of character, of a strong and vigorous intellect, of perfect rectitude, and is highly trained in the railroad profession, which he has followed with success for the last 44 years. In 1855 he was appointed General Manager of the London & South Western, and to his enlightened and vigorous management is due a good deal of the recent prosperity of that company and of the port of Southampton.

ELECTIONS AND APPOINTMENTS.

Altoona & Philadelphia Connecting.—George M. H. Good has been appointed General Superintendent, with headquarters at Philadelphia, Pa., to succeed George M. Case, resigned.

Arkansas & Louisiana.—J. D. Moore has been appointed Superintendent, with headquarters at Little Rock, Ark., to succeed Mr. J. E. Rose.

Atchison, Topeka & Santa Fe.—Andrew Smith, Superintendent of Telegraph of the Santa Fe Pacific, has in addition to that office been appointed Superintendent of Telegraph of the Southern California, to succeed Mr. W. A. McGovern, assigned to other duties. Mr. Smith's headquarters will be at Los Angeles, Cal.

Baltimore & Annapolis Short Line.—On account of the sale of this road, as mentioned in another column, the old officers have been retired, and the officials of the Annapolis, Washington & Baltimore have been made officers of this road. They are: President and General Manager, John Wilson Brown, Baltimore; Secretary and Treasurer, W. G. Bowdoin, Baltimore.

Brainerd & Northern Minnesota.—Charles A. Pillsbury has been elected President and J. E. Carpenter Vice-President, both with headquarters at Minneapolis, Minn.

Chicago, Milwaukee & St. Paul.—F. W. Boltz has been appointed Division Freight and Passenger Agent of the Sioux City & Dakota Division, with headquarters at Sioux City, Ia., to succeed E. W. Jordan, assigned to other duties. W. W. Hall has been appointed Commercial Agent, with headquarters at Cleveland, O., to succeed Mr. Boltz. C. A. Boyden has been appointed Commercial Agent, with headquarters at Pittsburgh, Pa., to succeed Mr. Hall. William Zang has been appointed Traveling Freight and Passenger Agent.

Chicago, Peoria & St. Louis.—Ralph Blaisdell, now Auditor, Secretary and Treasurer of the St. Louis, Chicago & St. Paul, has been appointed Auditor of the Chicago, Peoria & St. Louis, with headquarters at Springfield, Ill., to succeed Mr. W. D. Tucker.

W. E. Killen, heretofore Master Mechanic of the St. Louis, Chicago & St. Paul, with headquarters at Jerseyville, Ill., has been appointed Master Mechanic of this road, with headquarters at Jacksonville, Ill.

Cincinnati, Lebanon & Northern.—J. A. Lilly has been appointed Engineer and Roadmaster, with headquarters at Cincinnati, O., to succeed Mr. William Erbey, resigned.

Cleveland, Cincinnati, Chicago & St. Louis.—C. R. Lewis has been appointed Traveling Freight Agent, with headquarters at Chicago.

W. P. Deppe has been appointed Assistant General Passenger Agent, with headquarters at St. Louis, Mo.

Columbus, Sandusky & Hocking.—Taking effect Sept. 1 the office of Superintendent of Transportation has been abolished. C. L. Gardner has been appointed Trainmaster, with office at Fair Grounds Station, Columbus.

Detroit & Lima Northern.—A. L. Richmond has been appointed Auditor, with headquarters at Tecumseh, Mich., to succeed Mr. E. B. Hathaway, resigned.

Eureka Springs.—The office of General Passenger Agent was abolished Sept. 1 and all correspondence in relation to that office should now be addressed to the Manager.

Fort Worth & Denver City.—George K. Jackson, heretofore foreman of the company's shops at Wichita Falls, has been appointed Master Mechanic, with headquarters at Fort Worth, Tex., to succeed E. W. Hayes, resigned.

Great Northern.—J. E. Gibson has been appointed Traveling Passenger Agent, with headquarters at Des Moines, Ia., to succeed Mr. J. S. Watson.

Illinois Central.—C. A. Florence has been appointed General Eastern Passenger Agent, with headquarters at 387 Broadway, New York City, to succeed G. H. Stearns, transferred to Milwaukee, Wis., as Commercial Agent.

Iowa Central.—At the annual meeting of stockholders, held in Chicago Sept. 3, directors were elected as follows: Horace J. Morse, Giles E. Taintor, William E. Strong, Robert J. Kimball, E. H. Perkins, Jr., Russell Sage, Edward E. Chase, Benjamin Warren, Jr., Charles G. Dubois, Henry A. Gardner, Albert G. Frost, George P. Lee, Frederick S. Fales, Charles F. Quincy and Frederick Merritt. At a subsequent meeting of the directors the following officers were elected: President, Horace J. Morse; Vice-President, Edward E. Chase; Secretary and Treasurer, George R. Morse.

Kansas City, Pittsburgh & Gulf.—E. T. Emery, formerly Car Accountant, having been assigned to other duties, C. N. Atkinson has been appointed Car Service Agent in addition to his duties as Chief Clerk to the Assistant General Manager.

Milwaukee, Benton Harbor & Columbus.—The following appointments recently took effect: A. A. Patterson, Jr., General Manager; D. H. Patterson, Superintendent; Joseph W. Johnston, Auditor; H. E. Dickinson, General Freight and Passenger Agent; L. O. Schaefer, General Agent; E. C. Hurd, Chief Engineer, all with offices at Benton Harbor, Mich.

Minneapolis & St. Louis.—Charles E. Dafeo, heretofore Chief Train Dispatcher, has been appointed Trainmaster of that road, with headquarters at Minneapolis, Minn. He will be succeeded as Chief Train Dispatcher by Mr. William Coyne, with headquarters at Minneapolis.

New York, Susquehanna & Western.—At the annual meeting of stockholders, held in Jersey City Sept. 2, the present directors were re-elected, with the exception of

Garrett A. Hobart, who was succeeded by Henry Marquand.

Oregon Railroad & Navigation Co.—At the annual meeting of stockholders, held at Portland, Ore., Sept. 3, the following directors were elected: A. L. Mohler, H. W. Corbett, Henry Failing, W. M. Ladd, Miles C. Moore, W. B. Ayre, A. L. Mills, William Mackintosh, W. W. Cotton, A. S. Heidelberg, William L. Bull, Edward D. Adams, C. T. Coster, W. Goakman and Samuel Carr. At a subsequent meeting of the directors A. L. Mohler was elected President to succeed E. McNeill.

Pennsylvania Co.—A. B. Starr, Superintendent of the Northwest system, with headquarters at Allegheny, Pa., has been made Acting General Superintendent of that system, with headquarters at Pittsburgh, taking the place of Charles Watts, General Superintendent, who is now in Europe for the benefit of his health.

Rio Grande Western.—J. D. Kenworthy has been appointed Assistant General Freight Agent, to succeed S. J. Henry, recently made General Freight Agent. The appointment took effect Sept. 1.

St. Louis, Peoria & Northern.—George B. Simpson has been appointed General Freight Agent, with headquarters at St. Louis, Mo.

San Antonio & Aransas Pass.—At the annual meeting of stockholders, held at San Antonio, Tex., Sept. 1, the following Directors were elected: T. E. Stillman, M. D. Monserrate, R. H. Innes, J. W. Terry, T. B. Palfray, William Berry, F. H. Davis and William Mahl. Officers were subsequently elected as follows: President, T. E. Stillman; Vice-President, M. D. Monserrate; Secretary, Reagan Houston; Treasurer, William Fields.

South Carolina & Georgia.—M. B. Hutchinson has been appointed Traveling Freight Agent, with headquarters at Montgomery, Ala.

Southern California.—W. R. Beamer, Superintendent, will remove his headquarters to San Bernardino, Cal. Mr. Beamer will have charge of the maintenance of track, buildings, water service and bridges, except iron bridges, which remain under the supervision of the Chief Engineer.

Union Pacific.—A. G. Shearman, heretofore Traveling Passenger and Freight Agent, with headquarters at Cincinnati, O., has been appointed District Passenger Agent for the territory covering Ohio and parts of Kentucky, New York and Pennsylvania, with headquarters at Cincinnati.

Wisconsin & Michigan.—S. M. Fischer has been elected Treasurer to succeed J. C. Ames. The office of S. H. Harrison, Superintendent of Transportation, has been removed from Menominee, Mich., to Peshtigo, Wis.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Arizona & Coast Line.—This company has been incorporated in Arizona, with a capital of \$1,000,000, to build a road from Tucson, A. T., south 72 miles to Carabose, near the southern line of the territory. The directors are M. P. Freeman, Hugo J. Doney, I. M. Jacobs, C. H. Hoff and E. Hazard.

Canadian Pacific.—Mr. L. A. Hamilton, Land Commissioner of this company, is reported to be having surveys made in Western Ontario of the portages between Lake Wabigoon and Lake Manitou, and also between Pickerel Lake and Rainy Lake by way of Manitou River, with the purpose of building a railroad between those points, which would give connection by land and water from Wabigoon, on the main line, to the Lake of the Woods.

Canadian Roads.—A delegation of citizens from Haliburton, Ont., waited upon the Cabinet in Council at Toronto, Sept. 1, and asked for a bonus of \$3,200 per mile to build a railroad from the junction of the Irondale, Bancroft & Ottawa and the Grand Trunk railroads north 14 miles to a point north of Minden, Ont.

Chester & Becket.—This new road is open for business, though ballasting is not completed. It is about 5½ miles long and has been built to connect the Boston & Albany at Chester, Mass., with various granite quarries. (See this column for Aug. 6.)

Great Northern.—The extension of the Cavalier branch from Cavalier, N. Dak., northwest 13 miles to Walhalla, has been completed. The contract for building was let to A. Guthrie & Co., of St. Cloud, in June. Another extension is being built by the same company from Langdon, N. Dak., northwest 23 miles to a point near the Canadian line. This is to be completed soon.

Houston, East & West Texas.—This company is relaying 115 miles with 60-lb. rails. Of this 75 miles is on the main line, which runs from Houston to Sabine River, Tex., 192 miles, and 40 miles on the Houston & Shreveport Division. Twenty miles of the main line is completed.

Kansas & Southeastern.—The Town Board of Parker, Okla., has granted the right of way to this company. The contract has been let and building is to commence at once. The road as projected is to run from Parker northeast 18½ miles, crossing the Kansas state line to a point on the St. Louis, Kansas & Southwestern at or near South Haven.

Kansas City & Northern Connecting.—Surveys are completed and contracts let for the extension of this line from Smithville, Mo., north 52½ miles by way of Plattsburgh and Osborn to Pattonsburg, where it will connect with a line from Trenton, Mo., to be built by a syndicate, to connect with the Omaha & St. Louis, the Quincy, Omaha & Kansas City and the Kansas City, Pittsburgh & Gulf. In January this company purchased the Kansas City & Atlantic, running from North Kansas City north 20.2 miles to Smithville, which is now being operated. Contracts for the extension have been let as follows: From Smithville to Plattsburgh to Bernard Corrigan, Kansas City, Mo., and from Plattsburgh to Pattonsburg to Monroe & Lee, Kansas City, Mo. Six miles of the line north of Smithville are graded, and work is being pushed on the other 10 miles to Plattsburgh. Nearly the entire extension is earthwork. The maximum grade is to be 66 ft. to the mile and the maximum curve 5 deg. There is to be one 200-ft. span steel bridge, one 150-ft. span, one 100-ft. span and two 60-ft. plate girders. The road will use the Kansas City Suburban Belt Railroad for its terminal in Kansas City. Grading is nearly completed for the connection with the Milwaukee bridge at Kansas City and track will soon be laid. A. E. Stilwell, Kansas City, Mo., is President and Theodore C. Sherwood, Kansas City, General Manager.

Louisiana & Northwest.—The extension of this road from Homer, La., northwest about 36 miles to Magnolia, Ark., is now being built. About six miles of the new grade is completed. The present road runs from Bienville, La., north 36 miles to Homer. J. D. Beardsley, Gibbsland, La., is lessee and General Manager.

Mexican Roads.—A survey is being made for the proposed railroad from Chihuahua west to the Pacific Coast, under the government concession recently made to Messrs. Hendrique C. Creel and Alfredo A. Spendlove (see this column for July 16). Chief Engineer Stafford, of New York, is in charge of the survey. The concession provides that plans for 200 km. (124 miles) must be submitted to the government before June 13, 1898, and that this section must be built before a year later. The road must be completed at the rate of 100 km. a year.

Mexican Southeastern.—Grading is reported to be completed from San Geronimo to Juchitan, 16 km. (10 miles), with the prospect that 34 km. more will be completed by Sept. 15. Chief Engineer Stuart then expects to submit plans for the second section of 50 km. (31 miles). The right of way for the first 50 km. is paid for and ties have been obtained for the first 100 km. The road as projected is to run from San Geronimo, Oaxaca, a point on the National Tehuacan Tepec, southwest along the Pacific coast about 420 km. (261 miles), with a branch of 200 km. running north from Tonala to Tuxtla Gutierrez. The government has granted a subsidy of \$6,000 per kilometer.

New Roads.—It is reported that a railroad to be known as the Chicago, McAlester Springs & Southwestern, is projected by a Boston syndicate to run from Marshall, Mo., southwest through Clinton, Mo., and Tablequah, I. T., to Fort Worth, Tex.

Articles of incorporation have been filed in Arizona for a narrow gauge line in Graham County, to run from Guthrie, Ariz., a point on the Arizona & New Mexico, northwest 16 miles to Morenci.

A survey is being made, according to report, for a road to run from Velasco, Tex., at the mouth of the Brazos River, west about 50 miles to Bay City.

Ontario & Rainy River.—Surveys are now in progress for this line, which is projected to run from Port Arthur, Ont., a point on the Canadian Pacific, west about 225 miles to Fort Frances. The grade is heavy, being in some places over 100 ft. to the mile.

Pennsylvania.—Connections were made on Sept. 5 for the new tracks at Trimmer's Rock, one mile east of Newport, Pa. This has been built to replace a section of the main line and is about a mile in length. It crosses the canal over iron bridges at several points and takes out a good deal of curvature.

Quebec Central.—This company has begun to relay a portion of its main track between Sherbrooke and Quebec with 70-lb. rails. The company has purchased 2,000 tons of rails from the Carnegie Steel Company, which will be used to relay about 18 miles of road from Thetford Mines Station north to Tring Junction. About 50 miles more will be relaid as soon as possible with 60-lb. rails, which are almost new and already on the ground. Frank Grundy, Sherbrooke, P. Q., is General Manager.

St. Louis Southwestern.—Surveys have been completed for an extension of this road from Delta, Mo., east 16 miles to Gray's Point, on the Mississippi River, about five miles below Cape Girardeau. The proposed line is to parallel the St. Louis, Cape Girardeau & Port Smith for three miles. At Gray's Point the necessary inclines will be built to facilitate transfer across the river. The Gray's Point Terminal Co., which was incorporated on May 23, 1896, in the interests of this company to build the extension, authorized on Aug. 31, 1896, a mortgage of \$500,000.

Tennessee Northern.—It is expected by the officials of this company that the first 13 miles of its road will be completed and in operation by Sept. 15. The road as projected extends from a point on the Southern, near Coal Creek, north about 25 miles to the Cumberland Coal and Iron Company's properties in Big Creek Gap, about one mile north of La Follette, Tenn. It has been a very difficult road to build owing to the mountainous character of the country. Alfred A. Glasier, 104 Ames Building, Boston, is President, and J. K. Sroufe, of La Follette, is Chief Engineer.

Texas, Arkansas & Louisiana.—This company has been incorporated in Texas with a capital of \$100,000, which can be increased to \$200,000 to build a line in Cass County, Tex., from Atlanta, a point on the Texas & Pacific, east 18 miles to Bloomburg, a point on the Kansas City, Pittsburgh and Gulf. The road was completed for a distance of eight miles and opened for traffic Sept. 1.

Texas Central.—This company is reported to have begun a survey for a branch from Ross Junction east to connect with the Missouri, Kansas & Texas at Geneva, 8 miles north of Waco. It is to be used to furnish gravel for the Missouri, Kansas & Texas.

Tuscarora Valley.—This company is reported to have begun a survey for an extension from Blair's Mills, Pa., southwest about 50 miles through Huntingdon and Fulton counties to Hancock, Md., a point on the Baltimore & Ohio. The present road runs from Port Royal, Pa., southwest 27 miles to Blair's Mills.

Yazoo Delta.—This road is being built at the rate of two miles a week, with 400 men at work. It is projected to run from Moorhead, Miss., north 95 miles through Sunflower, Washington, Yazoo and Coahoma counties. About 21 miles from Moorhead are completed and in operation with three trains in daily use. C. H. Pond, Moorhead, Miss., is President.

Electric Railroad Construction.

Auburn, Ind.—The Commissioners of De Kalb County recently granted the right of way for an electric road between Garrett, Auburn and Waterloo, to the Northwestern Indiana Railway Co., of Auburn.

Baltimore, Md.—Articles of incorporation have been prepared of the Baltimore, North Point & Bear Creek Electric Railway Co., the incorporators named being Messrs. Daniel Teller, of Baltimore County, and Samuel Greenwald, Sr., J. T. Smith, H. G. Bready and Robert H. Carr, Jr., all of Baltimore. It is proposed to run the road from East and Monument streets to Bear Creek, about five miles, and is to be double track all the way. Mr. Teller is President; Mr. Carr, Secretary and Treasurer; Mr. Greenwald, General Manager, and Mr. Bready, Chief Engineer.

The Blue Ridge Electric Railway & Power Co., will probably begin work on its line some time this fall or early in the spring. The line will be about 10½ miles in length, connecting with several summer resorts in the Blue Mountains.

At a meeting of the Southwest Baltimore Improvement Association, held last week, a number of the

property owners living near Gwynn's Falls urged the Association to hasten the building of the electric road which is proposed by the Consolidated Railway Co. A committee was appointed to urge the building of the line.

Chatham, Ont.—The Chatham City & Suburban Railway Co. proposes to extend its line north from Chatham through the township of Dover to Mitchell's Bay, thence to Wallaceburg and Petrolia. Mr. George C. Rankin is one of the chief promoters.

Easton, Pa.—Work will probably be begun very soon on the road to be built by the Easton, Palmer & Bethlehem Railway Co.

Framingham, Mass.—The Framington Union Street Railway Co. is making arrangements for introducing electricity as the motive power on the Saxonville division of the road. Recently the Framingham Center division changed its motive power from horse to electricity.

Greensburg, Pa.—An engineering corps for the proposed electric road between Mt. Pleasant and Greensburg have gone over the route. Two lines are proposed from a point several miles out in the country, one going into Mt. Pleasant at the West End over Sand Hill, and the other following the Standard road.

Hagerstown, Md.—The Blue Ridge Electric Railway & Power Company, of Washington county, was incorporated Sept. 2. The capital stock is fixed at \$200,000, and the incorporators are Simon P. Schott, Winfield S. Cahill, Roger W. Barron, Ernest Knabe, Jr., August Beck of T., W. R. Weaver and Charles J. Weiner.

Kingston, Jamaica.—Arrangements are being made for an electric road to be built in Kingston, Jamaica. It is proposed to expend about \$5,000,000 in building 25 miles of track and equipping the line. H. M. Whitney, President of the Halifax Electric Tramway Co., is making final arrangements for its construction.

Kingston, Ont.—An electric railroad will be built on Well's Island, connecting Thousand Island Park, Fine View and Westminster Park, a distance of seven miles.

Lewisburg, Pa.—The promoters of an electric road between Watsonstown and Milton and Lewisburg are making arrangements for its construction. The present plan provides for the control of the electric lighting stations for the three towns.

Meadville, Pa.—The Meadville Traction Co. has several miles of road under construction in the city, has nearly completed a short branch to the Ponce de Leon Mineral Springs east of the city, and expects to complete the road through Saegertown, Venango and Cambridge, and to Edinboro, a distance of 15 miles, as rapidly as possible. Work on the power house is to commence at once, and a portion of the line will be in operation within a few weeks.

Montoursville, Pa.—Mr. E. A. Tennis, President of the Montoursville Electric Railway Co., informs us that the roadbed is finished and the machinery is being placed in the power-house, and that cars will be running not later than the 20th of this month.

New Brunswick, N. J.—The Brunswick Traction Co. has renewed its effort to obtain permission to continue the work of building the line between New Brunswick and Bound Brook. The matter was argued before Justice G. C. Ludlow last week, but the decision was reserved.

Newburyport, Mass.—The Massachusetts railroad commissioners have issued their certificate to the effect that the new Plum Island Electric Street Railway Co. has complied with the public statutes in its articles of association.

Northboro, Mass.—The Aldermen of Northboro have granted the permission of the Worcester-Marlborough Street Railway Co. to build its line through Northboro.

Pottsville, Pa.—Tracklaying has been commenced on the new trolley line of the Pottsville & Reading branch of the electric railroad below Mauch Chunk street. The ordinance passed by the Mt. Carbon Borough Council and accepted by the Pottsville & Reading Co. guarantees the running of cars every half hour.

Sarnia, Ont.—A project is on foot to construct an electric railroad from Sarnia to Weisbeach.

Shenandoah, Pa.—Hamilton Godfrey and other Reading capitalists are about to apply for a charter for an electric road from Shenandoah City to Ringtown. The distance from the latter place by rail is about 30 miles, while by wagon road it is but 3½ miles. It is proposed to build the line along the pike and over the mountain, and the projectors hope to have it ready for business by next summer. A survey will soon be made.

Toledo, O.—The route of the Toledo, Bowling Green & Finlay Railroad has been decided upon. Between Mungen and Jerry City the road will pass opposite the old Cold Water roadbed, and the company proposes to build the road so that freight cars from the Toledo & Ohio Central can be run from Bowling Green to Jerry City. This part of the route will probably be completed this fall. An effort may be made to secure right of way for an extension beyond Jerry City.

Waynesboro, Pa.—The capital stock of the Blue Ridge Electric Railway Co. will be \$200,000. The road, as originally projected, was to run from Germantown to Washington County, Md. (where the power house will be located), to Blue Ridge Summit to Monterey, and thence through Monterey and Cone avenues to Buena Vista Springs Hotel and Buena Vista station, to Penmar, Blue Mountain House, High Rock, Ragged Edge and Mt. Quirak.

Winnipeg, Man.—Notice has been given of a special meeting of the shareholders of The Winnipeg Electric Street Railway Co. to be held at Montreal, on September 16, for the purpose of considering, and if deemed advisable approving of the acceptance of the offer made by the Manitoba Electric & Gas Light Company for the sale to the Street Railway Co. of the franchises, rights, powers, assets, plant and appliances of the former company for \$400,000, and the carrying out to completion of such agreement and purchase.

Yarmouth, Me.—A special meeting has been held to act on the question of granting a franchise for an electric road through the streets of the town. The railroad company will be required to pave its tracks between the rails and 18 in. either side, in accordance with the original plan.

GENERAL RAILROAD NEWS.

Baltimore & Annapolis Short Line.—This road on Sept. 1 passed into the control of Alexander Brown & Son, which firm already controls the Annapolis, Washington & Baltimore. The Baltimore & Annapolis Short Line extends from Baltimore to Annapolis, Md., 28 miles.

and is capitalized for \$400,000 common and \$500,000 preferred stock. The Annapolis, Washington & Baltimore extends from Annapolis to Annapolis Junction, Md., 20.5 miles. Two separate companies will be maintained but the roads will be operated in common.

Atchison, Topeka & Santa Fe.—The earnings for July were as follows:

	1897.	1896.	Inc. or Dec.
Average oper. mileage.....	6,934.66	6,890.04	I. 44.62
Gross earn.....	\$2,594,231	\$2,364,438	I. \$229,793
Oper. expen.....	2,129,473	1,810,540	I. 318,933
Net earn.....	\$464,758	\$553,898	D. \$89,140
Taxes and rentals.....	136,283	164,516	D. 28,233
Surplus.....	\$328,475	\$389,382	D. \$60,907

Chicago, Burlington & Quincy.—The earnings for July were as follows:

	1897.	1896.	Inc.
Gross earn.....	\$3,043,059	\$2,753,351	\$289,708
Oper. expen.....	1,956,624	1,789,028	176,596
Net earn.....	\$1,806,435	\$973,323	\$1,112,112
Charges.....	890,100	876,202	13,798
Surplus.....	\$196,435	\$97,121	\$99,314

Cleveland, Cincinnati, Chicago & St. Louis.—Earnings for July were reported as follows:

	1897.	1896.	Inc. or Dec.
Gross earn.....	\$1,099,658	\$1,081,151	I. \$18,507
Oper. expen.....	816,593	820,341	I. 3,748
Net earn.....	\$283,065	\$260,810	I. \$22,255
Fixed charges.....	238,523	231,560	I. 6,963
Surplus.....	\$14,540	\$16,253	D. \$1,713

Columbus, Hocking Valley & Toledo.—In the attempted reorganization of the affairs of this company, J. P. Morgan & Co., of New York, announce that they will pay a further advance of \$20 on each of the \$1,000 five per cent. bonds deposited with them. The deposits are made in accordance with a circular issued by them Feb. 25 (see this column for March 5), in which they offered to advance \$25 on each \$1,000 five per cent. bond deposited with them in payment of the defaulted March 1 coupon.

Columbus, Lancaster & Wellston.—This road, formerly known as the Lancaster & Hamden, was purchased at receivers' sale in Columbus, O., Sept. 1, by William H. Stevenson, of New York, for \$150,000. The road was sold by Receiver W. F. Black under orders of Judge William H. Taft, of the United States Court, to satisfy the claim of James Kyner, a contractor, for building the road. This road was chartered in 1887 to run from Lancaster, O., to Hamden. Of this 34 miles from Lancaster Junction to Bloomingville are now in operation.

Eel River.—Judge Brownlee, of the Superior Court of Howard County, Ind., has appointed Richard Rudell, President of the Citizens' National Bank of Kokomo, Ind., Receiver for this road, and declared the charter forfeited. This is the result of a suit of long years' standing, brought by the State of Indiana for the forfeiture of the charter on the ground that a corporation leasing itself to another competing line forfeits its charter. This road, which runs from Logansport, Ind., to Butler, 94.2 miles, was leased in perpetuity Oct. 6, 1887, to the Wabash. That company has fought the suit and will appeal.

Fitchburg.—At the annual meeting to be held Sept. 29 stockholders will be asked to authorize the issue of \$1,350,000 bonds in payment of a \$500,000 mortgage note of the Hoosac Tunnel Dock & Elevator Co., due April 5, 1898, for refunding \$500,000 six per cent. bonds of the Cneshire Railroad, due July 1, 1898, and for refunding other borrowed money.

Flint & Pere Marquette.—The stockholders of the Monroe & Toledo have voted to sell their road to this company for \$400,000. This road extends from Monroe, Mich., southwest 18.8 miles, to a point on the Ann Arbor, near Toledo, whose tracks are used for entrance into Toledo. It was built for the Flint & Pere Marquette, being completed Nov. 16, 1896, at a cost of \$346,334. The Flint & Pere Marquette will issue a mortgage to cover the purchase price.

Houston & Texas Central.—The six per cent. debenture bonds, \$705,430, and the 4 per cent. debenture bonds, \$411,000, maturing Oct. 1, 1902, will be paid in cash at the office of the General Trust Co., New York. The company will renew these bonds to the amount of \$600,000 in 5 per cent. debenture bonds guaranteed by the Southern Pacific if presented between Sept. 15 and Oct. 5.

Louisville & Nashville.—The earnings for July were reported as follows:

	1897.	1896.	Inc.
Gross earn.....	\$1,795,427	\$1,627,601	\$167,826
Oper. expen.....	1,167,741	1,127,612	40,129
Net earn.....	\$627,716	\$500,000	\$127,716

New York, Chicago & St. Louis.—The earnings for the year ended June 30 were reported as follows:

	1897.	1896.	Inc. or Dec.
Gross earn.....	\$5,377,490	\$6,162,567	D. \$785,077
Oper. expen.....	4,256,108	4,908,774	D. 652,666
Net earn.....	\$1,121,082	\$1,253,793	D. \$132,711
Other income.....	6,271	11,574	D. 5,303
All income.....	\$1,127,353	\$1,265,367	D. \$138,014
Charges.....	1,131,770	1,082,747	I. 49,023
Balance..... (Def.)	\$1,417	\$182,620	D. \$181,203
Dividend.....		250,000	D. 250,000
Deficit.....	\$1,417	\$67,380	D. \$68,797

Northern Pacific.—The Trustees have called the entire issue of \$1,755,000 Missouri Division first mortgage six per cent. bonds of 1879 for redemption at par, with accrued interest to Nov. 1. They are to be replaced by prior lien 100 year gold four per cent. bonds, dated Jan. 1, 1897, secured by mortgage to the Mercantile Trust Co., of New York, on all the property of the company, as determined under the late reorganization. The old bonds were to run to May 1, 1919. Holders of Northern Pacific Railroad and Land Grant general first mortgage sinking fund 6 per cent. gold bonds have been notified that the right to convert them into prior lien 4s of this company, on a basis of \$1,320 preferred lien bond for each \$1,000 general first mortgage, will terminate Nov. 1.

Oregon Improvement.—The Waterbury Reorganization Committee and the Rolston Consolidated Committee have reached an agreement (see this column of Aug. 20) whereby the consolidated bonds (\$6,549,000 outstanding) are to be exchanged for five per cent. in first preference five per cent. stock, 60 per cent. in second preferred stock, and 40 per cent. in common stock.

Under the old plan they were to be exchanged for 62½ per cent. in preferred stock and 75 per cent. in common stock. The 12½ per cent. cash assessment remains under the new plan. There is also a change in the terms of surrender for the old common stock (\$7,000,000 outstanding), whereby it is exchanged for 10 per cent. in first preferred stock instead of 10 per cent. in preferred and for 60 per cent. instead of 50 per cent. in new common stock. The 10 per cent. cash assessment remains.

Oregon Short Line & Utah Northern.—Holders of certificates of deposits for collateral trust bonds of this road, issued by the Guaranty Trust Co., of New York, prior to the sale of the road on Jan. 9 last, are notified that they can receive in exchange the new "B" income bonds of the Oregon Short Line, issued under the plan of reorganization.

Pennsylvania Co.—Bondholders of the first mortgage bonds of the Toledo, Walhonding Valley & Ohio, a part of this company's lines in Ohio, have been notified that the company will purchase \$25,070 of these bonds on Oct. 1, at the office of the Farmers' Loan & Trust Co., New York, from the lowest bidders at a price not exceeding par with interest. The first mortgage bonds of the company are 40-year 4½ per cent. gold.

A similar call has been issued for \$281,826 of consolidated mortgage bonds of the Pittsburgh, Cincinnati, Chicago & St. Louis, controlled by the Pennsylvania Co., which guarantees the bonds. These are 50-year 4½ per cent. gold bonds.

Peoria, Decatur & Evansville.—The Reorganization Committee announces an extension of time for receiving subscriptions and bonds until Oct. 1. For the plan in detail see this column for June 4.

St. Louis & San Francisco.—The earnings for July were reported as follows:

	1897.	1896.	Inc. or Dec.
Gross earn.....	\$528,495	\$489,069	I. \$39,426
Oper. expen.....	333,023	276,533	I. 56,490
Net earn.....	\$195,472	\$212,536	D. \$17,064

Southern.—Notice was given to the stockholders of the Virginia Midland that the offer to exchange preferred stock of that company for that of the Southern on the basis of 100 shares of Virginia Midland for 70 shares of Southern will be withdrawn Sept. 30.

Wabash.—The reported earnings for the fiscal year ended June 30 were as follows:

	1897.	1896.	Inc. or Dec.
Gross earn.....	\$11,526,787	\$12,807,142	D. \$1,280,355
Oper. expen.....	7,979,159	9,242,604	D. 1,263,445
Net earn.....	\$3,547,628	\$3,564,538	D. \$16,910
Taxes.....	529,970	519,678	I. 10,292
Balance.....	\$3,017,658	\$3,044,860	D. \$27,202
Other income.....	113,304	140,749	D. 27,435
Balance.....	\$3,130,962	\$3,185,599	D. \$54,637
Rents, etc.....	408,085	417,254	D. 9,169
Balance.....	\$2,722,877	\$2,768,345	D. \$45,468
Fixed charges.....	2,694,545	2,701,545	D. 7,000
Surplus.....	\$28,332	\$66,800	D. \$38,468
Dividends.....		35,000	D. 35,000
Net surplus.....	\$28,332	\$31,800	D. \$3,468

Wheeling & Lake Erie.—The committee, of which George Coppel is Chairman, appointed in the interest of holders of first mortgage bonds (see this column for July 2) announces that more than a majority of the bonds have been deposited with the Guaranty Trust Co., of New York, under the agreement. Holders of other bonds not deposited are requested to deposit them at once that action may be taken immediately in the interest of the bondholders.

Electric Railroad News.

Baltimore, Md.—The Baltimore City Passenger Railway has secured the bonds amounting to \$300,000 of the Baltimore, Middle River & Sparrow's Point Railway Co. The capital stock of the latter company amounts to \$400,000, and it is said that the road will now pass into the hands of the Baltimore City Passenger Railway.

Boston.—On Sept. 1 the subway was opened for traffic. For the present the cars will run about 1½ miles underground. The remainder of the tunnel will not be completed before next year.

Brooklyn, N. Y.—Col. John N. Patridge has resigned the Presidency of the Brooklyn City & Newtown Railroad Co., known as the DeKalb Avenue road, and John I. Heins, General Superintendent, has been elected to fill the vacancy. It is believed that there will soon be a consolidation of this road and the Brooklyn Rapid Transit Co., and the Coney Island & Brooklyn Railroad Co.

A fire which occurred on Sept. 3 at Brooklyn destroyed the general repair shop of the Nassau Electric Railroad at Thirty-seventh street and Fourteenth avenue. Nine teen trolley cars and a quantity of material were also destroyed. The entire loss is said to be not less than \$75,000.

Marion, Ind.—J. L. Bradford has been named as Receiver of the Indianapolis & Anderson Electric Railway Co., on the application of A. B. Smith and T. J. and C. F. Haworth.

Montreal, Que.—A statement issued by the Montreal Street Railway Co. shows that the average daily earnings for the past 11 months have been \$3,630, which is an average daily increase over the year previous of \$240. The increase for the 11 months is \$80,477 over that reported in 1895.

Mt. Clemens, Mich.—A hearing will be held Sept. 15 in the injunction suit of the Rapid Railway Co., to restrain the city from tearing up the Y at South Gratiot and Cass avenues, and also the tracks on Butler street. The company holds that the track and the Y were laid under a franchise of the Mt. Clemens & Lake-side Traction Co.

TRAFFIC.

Traffic Notes.

An agent of the Interstate Commerce Commission has had a large number of freight agents and flour shippers summoned before the Grand Jury at Minneapolis, Minn., presumably to testify in regard to illegal rate cutting.

The movement of freight over the Middle Division of the Pennsylvania Railroad in August was 135,216 cars, a large increase over the same month last year. On the

night of Aug. 31 the Chicago, Burlington & Quincy sent eastward from Galesburg 1,230 loaded cars.

In the \$10 excursions from Pittsburgh to the New Jersey seashore resorts the number of passengers carried this year has been nearly or quite 10,000, of which, according to the Pittsburgh papers, about three-fourths went over the Pennsylvania and the rest over the Baltimore & Ohio.

Business houses all over the Western States have received letters from A. B. D. Searles, whose address (Pueblo, Colo.) seems to be a temporary one, claiming that he can combine the shipments of different shippers of car-load freight and secure reduced rates, the profits from which scheme he will divide with the shippers. He conveys the impression that he has handled for various merchants over 6,000 car-loads of freight during the last six months. He enjoins upon the recipients of his letters the strictest secrecy.

A "Recommendation" from the Interstate Commerce Commission.

The Interstate Commerce Commission, in an opinion by Chairman Morrison, has recommended reduction of freight rates to Eureka Springs, Mo., over the Eureka Springs and St. Louis & San Francisco railways. The Eureka Springs Railway has for many years carried to its terminus freight at greatly reduced rates when intended for points beyond to be reached by wagon transportation. The commission holds that this arrangement does not make the railway a carrier beyond Eureka Springs, and that such lower rates are a discrimination against Eureka Springs and its business. The opinion continues: "That transportation charges should be liberal, until the earnings are fully sufficient for a fair return on actual investment, will hardly be questioned, but it does not follow that rates long maintained and grossly discriminative must be continuous, and may be lawfully exacted year by year, though it be assumed that railroad investment or property is so much more inviolable than other property, that its owners must bear none of the losses or disadvantages incident to industrial and financial disarrangement, and that transportation charges are never excessive when the annual net earnings are less than the amount necessary to the reasonable annual income on such property and investment."

The opinion calls attention to the recent decision of the Supreme Court regarding the power of the commission to fix rates which shall control in the future. Of this decision, the opinion says: "Under the law as construed by the court, the commission has power to say what in respect to the past was reasonable and just, but as to rates complained of as unreasonable, unjust and unlawful and so found to be by the commission, it can make no provision or order for their reduction which the courts are required to enforce or the carriers obliged to obey. When the rates are found to be unreasonable, the commission can declare them unlawful and recommend their reduction; and where, after investigation, rates of carriers complained of are found to have been in the past, and still to be, unjust, unreasonable and in violation of the statute, it is made the duty of the commission to notify and require such carriers to cease and desist from such violation."

Chicago Traffic Matters.

CHICAGO, Sept. 8, 1897.
At the conference held in Kansas City of Western lines and the Gulf roads, relative to grain rates and the situation generally, the President of the Kansas City, Pittsburgh & Gulf assured the other presidents that his line could not possibly prove a dangerous factor in hauling export grain to the Gulf ports for three or four months, as they were short of cars and were using what they had for other freight which is more profitable.

Some weakness in the rate situation is reported west of the Mississippi River, more especially on westbound freight, on which the temptation on the part of the weak lines to shade tariff rates to fill westbound empty cars is considerable. The strong lines, however, are determined to uphold the present basis if possible, and no serious disturbance is looked for. There appear to be several combinations of through lines which are making special efforts to secure westbound merchandise.

A large number of traffic officers have been summoned to a hearing before the Interstate Commerce Commission, at Kansas City, Sept. 21, when the Commission will hear the case of the American Warehouse Company, embodying a complaint against the granting of free storage on flour by the railroad companies at New York.

The Letter Carriers' convention was held at San Francisco after all. The railroads, besides making the round trip fare from Chicago \$62.50, made reductions in the rates for sleeping-car berths and for meals.

The vessel men are now easily getting two cents a bushel on corn to Buffalo.

The National Association of Merchants and Travelers, the Chicago organization which acted for the wholesale merchants in getting reduced passenger rates for retail merchants coming to Chicago, has stirred up a good deal of bad feeling by an injudicious effort to recompense the Atchison and the Chicago Great Western for their efforts in securing a general reduction of fares. These roads were the first two to act, and the Secretary of the Merchants' Association has sent to sustaining members a confidential circular reminding them of the fact. "While," says the Secretary, "there has been no bargain, members ought to reciprocate in freight shipments." And, in accordance with this request, he enclosed cards, to be hung in shipping offices, which show in a favorable light the routes of the roads named.

Eastbound shipments from Chicago and Chicago junctions to points at and beyond the Western termini of the trunk lines for the week ending Sept. 2 amounted to 76,560 tons, as compared with 66,511 tons the preceding week. This statement includes 35,236 tons of grain, 2,546 tons of flour and 15,420 tons of provisions, but not livestock. The following is the statement in detail for the two weeks:

Roads.	WEEK ENDING SEPT. 2.		WEEK ENDING AUG. 26.	
	Tons.	p. c.	Tons.	p. c.
Baltimore & Ohio.....	2,379	3.1	1,718	2.6
C. C. & St. Louis.....	4,711	6.1	4,025	6.0
Erie.....	9,131	11.9	7,623	11.4
Grand Trunk.....	9,084	11.9	8,827	13.3
L. S. & M. S.....	6,790	8.9	6,537	9.8
Michigan Central.....	18,222	23.8	17,745	26.7
N. Y., Chi. & St. L.....	2,738	3.6	2,836	4.3
Pitts., Cin. Chi. & St. Louis.....	5,460	7.1	4,052	6.1
Pitts., Ft. Wayne & Chicago.....	10,790	14.1	8,443	12.7
Wabash.....	7,249	9.5	4,705	7.1
Totals.....	76,560	100.0	66,511	100.0

Lake shipments last week were 217,943 tons.